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U.S. Drought Monitor

February 18, 2014
(Released Thursday, Feb. 20, 2014)

Valid 7 a.m. EST

U.S. Drought Monitor: A Look Behind the Scenes

USDA Outlook Forum
February 21, 2014

Eric Luebehusen
Meteorologist & USDM Author

World Agricultural Outlook Board
Washington, D.C.

Author:
David Miskus
NOAA/NWS/NCEP/CPC

Drought Impact Types:

~ Delineates dominant impacts

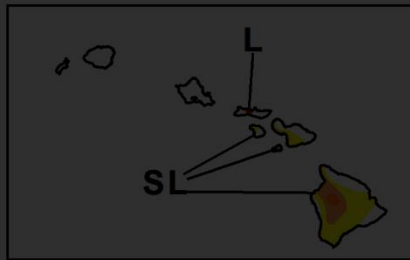
S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)

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

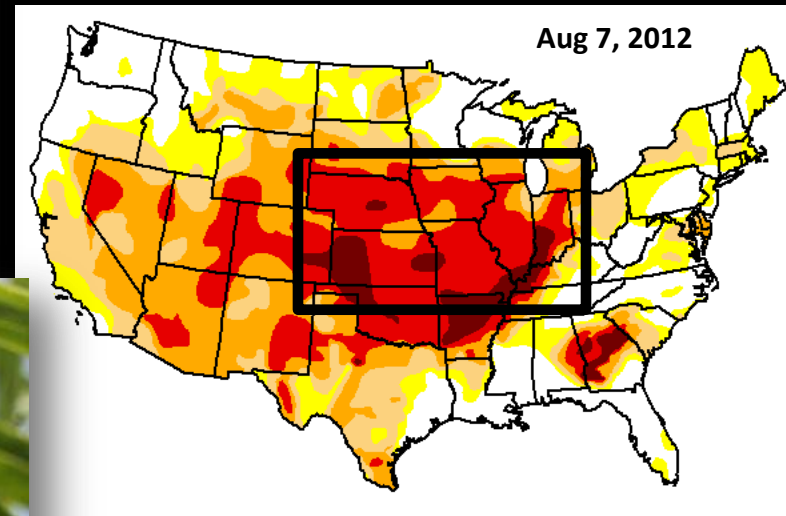
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



<http://droughtmonitor.unl.edu/>



In 2012, Midwestern Heat and Drought were a BIG story.



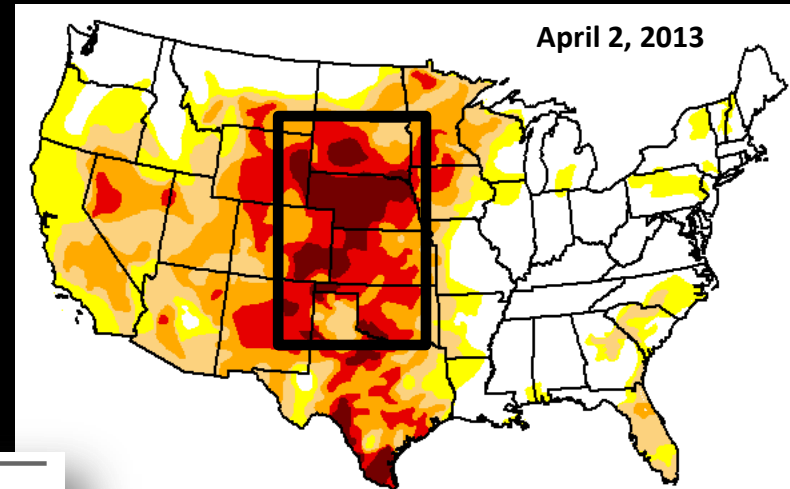
U.S. Drought In 2013 Hurts Cattle Ranchers With Dry, Poor Wheat Crop

Reuters | Posted: 01/14/2013 1:00 am EST



Drought Forces Farmers to Feed Cacti to Livestock

By spring 2013, the drought story shifted onto the Plains.



U.S. Drought In 2013 Hurts Cattle Ranchers With Dry, Poor Wheat Crop

Reuters | Posted: 01/14/2013 1:00 am EST



* Wheat pastures wither as drought persists

* Cattle moved to feedyards sooner than expected

* Record high cattle, beef prices seen this year

By Theopolis Waters

CHICAGO, Jan 14 (Reuters) - Oklahoma rancher Kent Donica has given up. The drought that has the region has won.

Since last September, Donica has sold nearly all of his 800 cattle because there is no pasture to nearby to make ends meet until it rains again.

Last autumn he had hoped his winter wheat crop would feed his cattle and keep his ranching business need to buy high-priced feed like corn, which would wipe out earnings from the cattle he fattens and

But the worst dry spell in half a century stopped the wheat crop from sprouting properly, depriving have sustained it through winter.

In 2013, Drought Is Worsening In Midwest And Plains States, Despite U.S. Winter Weather

Reuters | Posted: 01/28/2013 8:35 am EST



* Light showers not enough to ease drought

* U.S. hard red winter wheat in Plains at risk

* Corn, soybean crops grown in the west also at risk

By Sam Nelson

CHICAGO, Jan 28 (Reuters) - Dry weather continues to plague the drought-stricken U.S. Plains and western Midwest with only light showers and snowfall expected this week, an agricultural meteorologist said on Monday.

"The Plains and the northwest Midwest will still struggle with drought, there's not a whole lot of relief seen," said John Dee, meteorologist for Global Weather Monitoring.

Dee said there would be some light rain in the eastern portions of Kansas, Oklahoma and Texas late Monday and Tuesday, with heavier rainfall seen for the eastern and southeastern Midwest late Tuesday and Wednesday.

California Drought 2013: January, February Were Driest On Record

AP | By By TRACIE CONE and RICH PEDRONCELLI

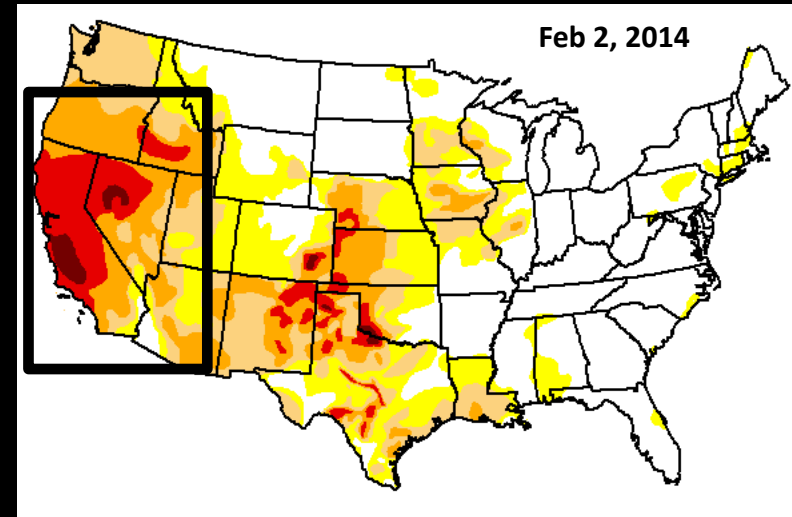
Posted: 03/01/2013 9:08 am EST | Updated: 05/01/2013 2:39 pm EDT



The monthly snow survey, anticipated snowmelt to supplement water supply, despite a few good dumps the state ease water managers' worries.

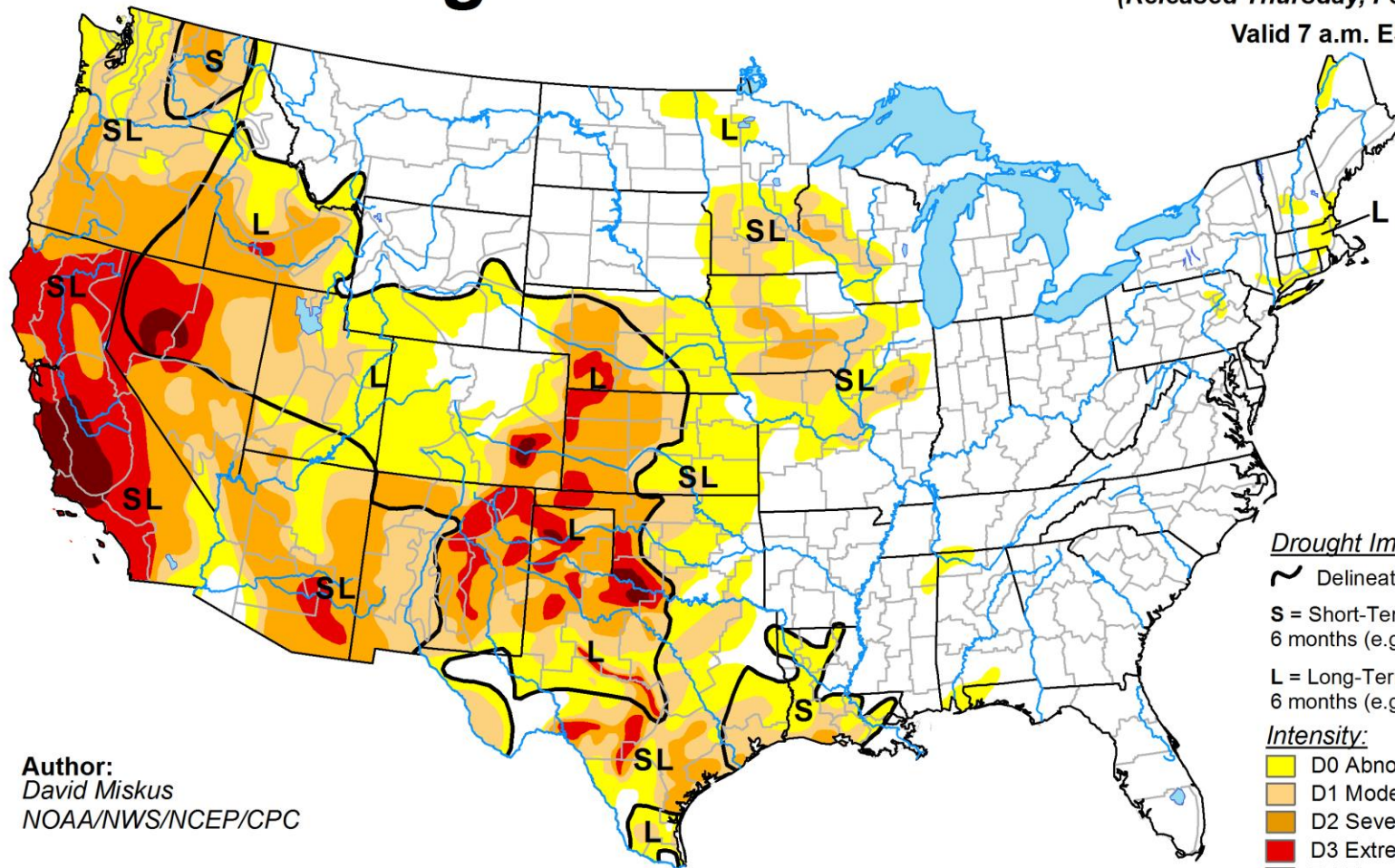


In early 2014, drought-impact stories emanated from the West.



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Author:
David Miskus
NOAA/NWS/NCEP/CPC

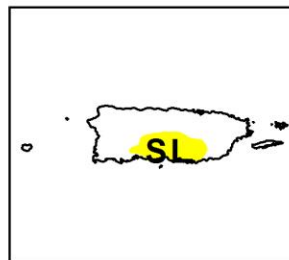
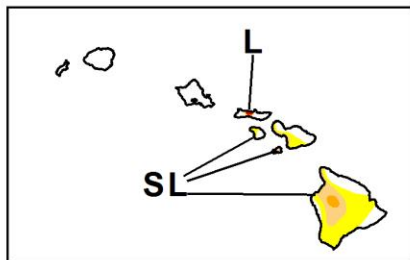
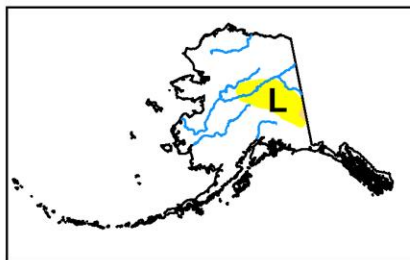
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- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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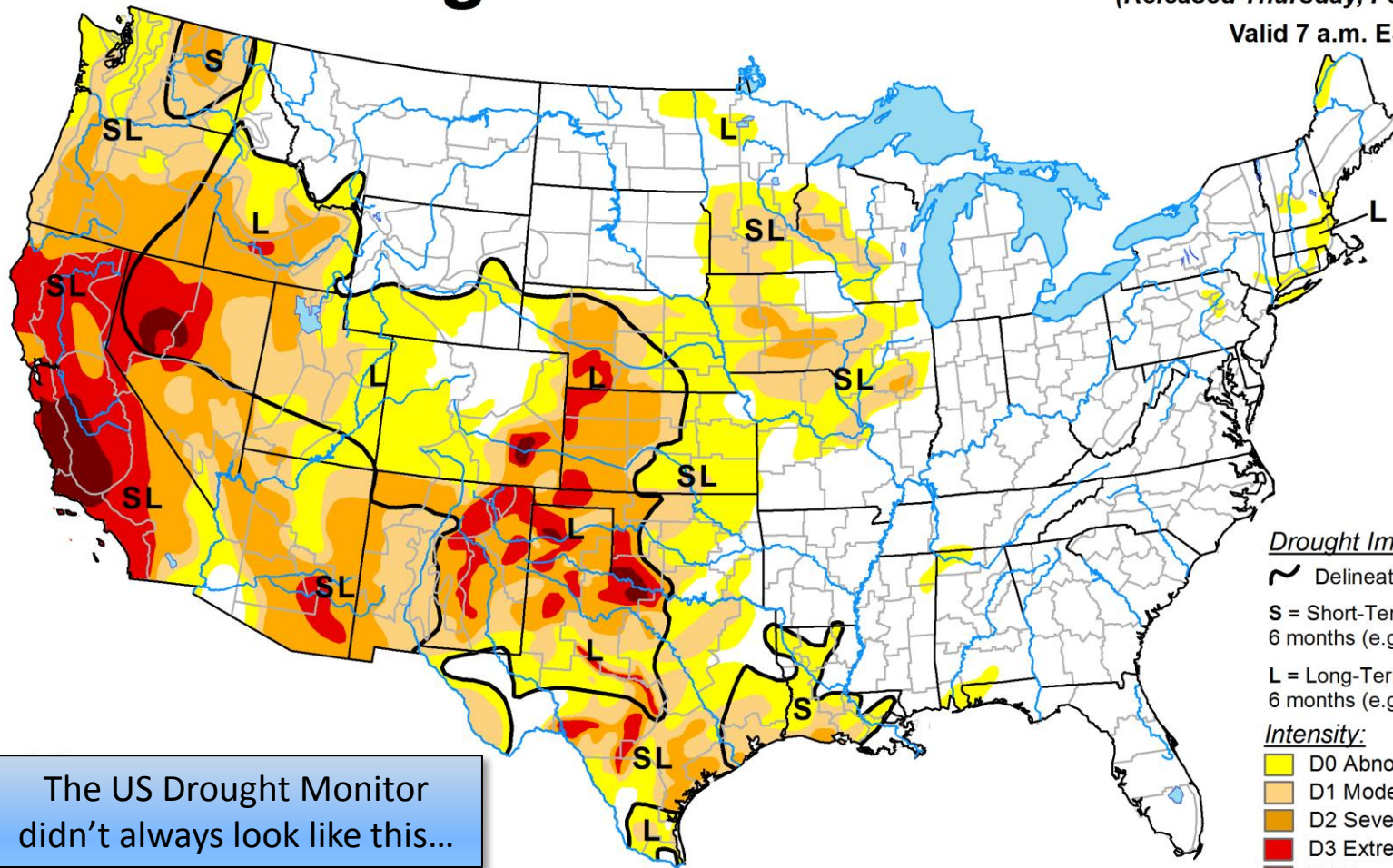


<http://droughtmonitor.unl.edu/>

History of the USDM

U.S. Drought Monitor

February 18, 2014
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The US Drought Monitor didn't always look like this...

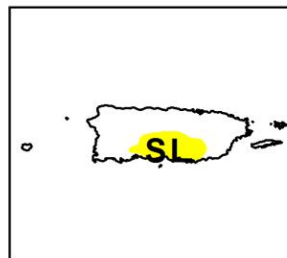
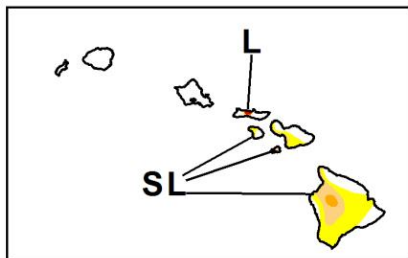
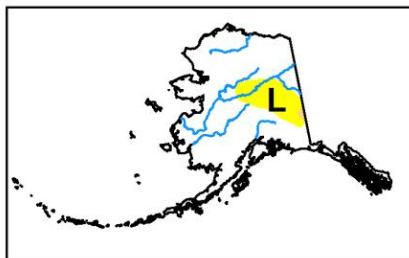
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- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

- Yellow: D0 Abnormally Dry
- Light Orange: D1 Moderate Drought
- Dark Orange: D2 Severe Drought
- Red: D3 Extreme Drought
- Dark Red: D4 Exceptional Drought

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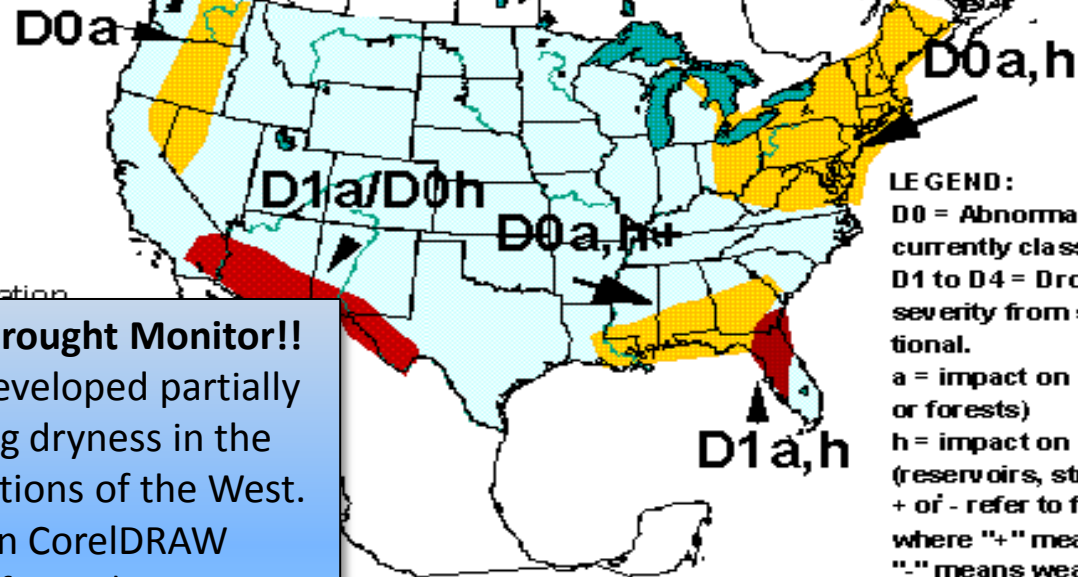


<http://droughtmonitor.unl.edu/>

EXPERIMENTAL DROUGHT MONITOR



May 20, 1999



LEGEND:

D0 = Abnormal dryness but not currently classified as a drought.
D1 to D4 = Droughts ranging in severity from standard to exceptional.

a = impact on plant life (agric. or forests)

h = impact on water supplies (reservoirs, streams, wells)

+ or - refer to forecast 2-wk trend, where "+" means intensifying and "-" means weakening. No sign means no significant change.

Areas depicted on chart are derived by consolidating information

1999 - The very first U.S. Drought Monitor!!

It was *experimental*, and developed partially in response to intensifying dryness in the eastern U.S. and across portions of the West.

The map was created in CorelDRAW (basic drawing software).

1999

| 2001

| 2003

| 2005

| 2007

| 2009

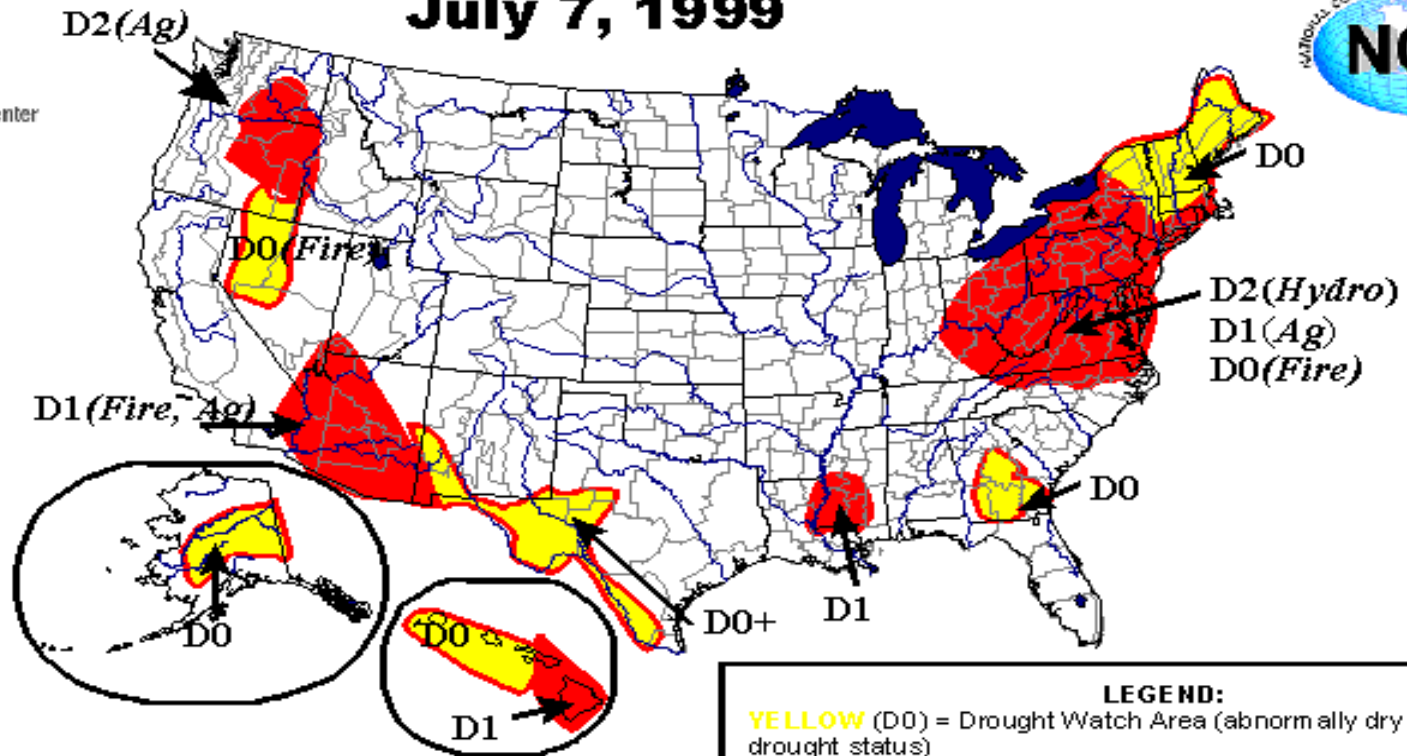
| 2011

| 2013



Experimental U.S. DROUGHT MONITOR

July 7, 1999



Summer, 1999 - Authors refined the map areas and tweaked the colors, altho it is readily apparent there weren't any Arts Majors on the team!

1999

2001

2003

2005

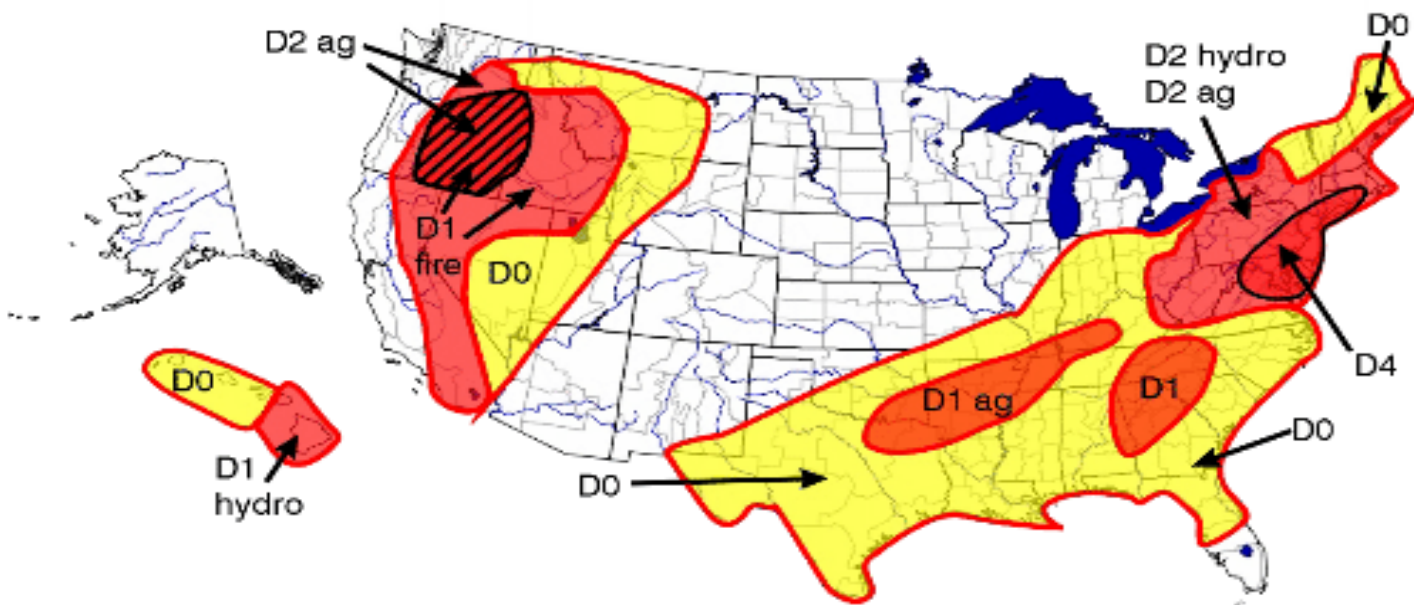
2007

2009

2011

2013

August 11, 1999 (revised as of 12:00 pm CDT) Experimental U.S. Drought Monitor



Aug 11, 1999 - The revised map was presented to senior-level government officials at a **White House Briefing**. They liked it so much...

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 next two weeks

Minus (-) = Forecast to diminish next two weeks

1999

2001

2003

2005

2007

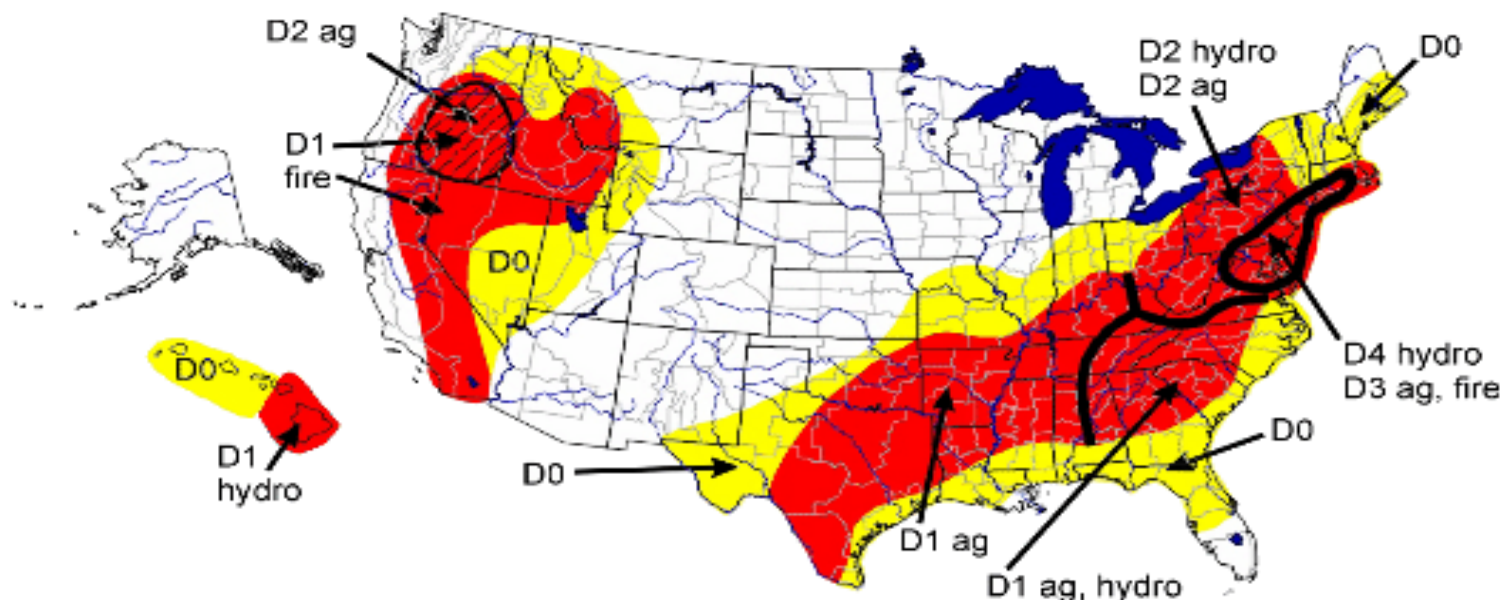
2009

2011

2013

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

U.S. Drought Monitor



...the following week, it went operational, making this **the first "official" U.S. Drought Monitor!**
This might have be the fastest ***Experimental* to *Operational*** product in government history!

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)

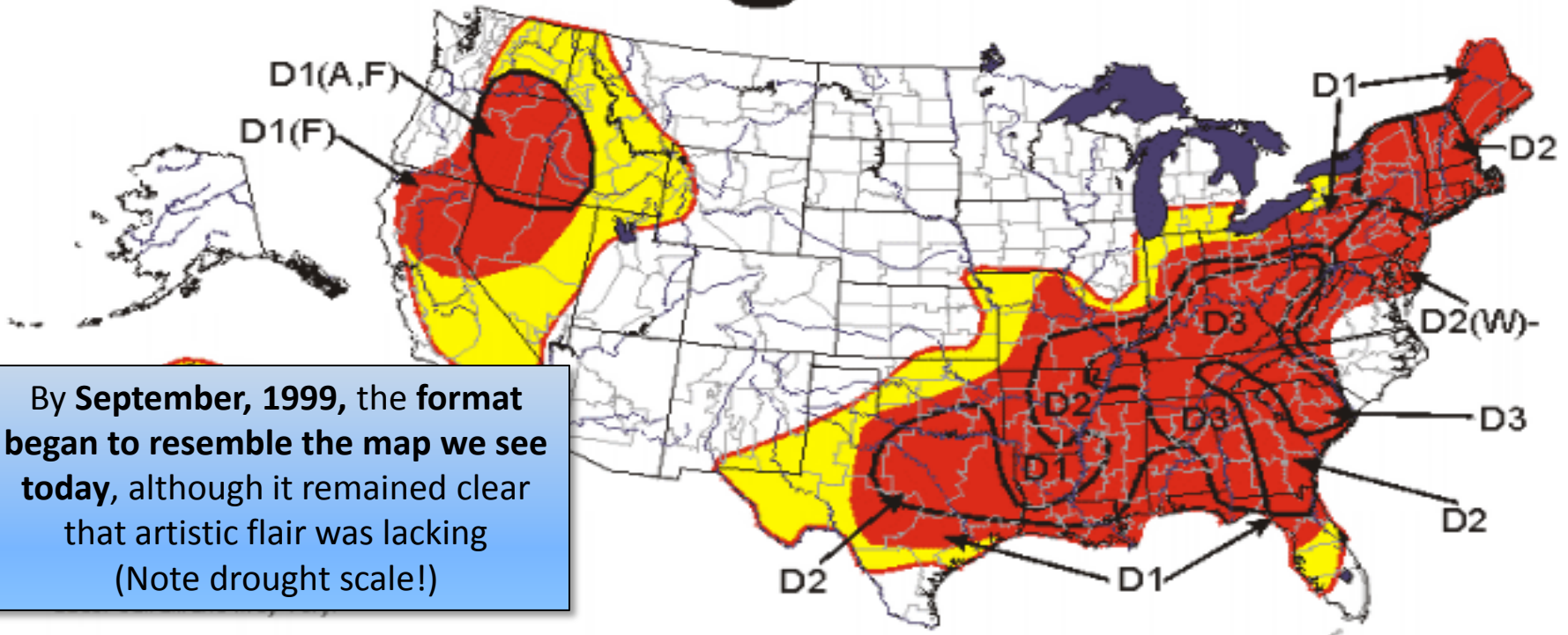
Hydro = hydrological (rivers, wells, reservoirs)

Plus (+) = Forecast to intensify next two weeks

Minus (-) = Forecast to diminish next two weeks

September 7, 1999

U.S. Drought Monitor



- D0 Watch
- D1 Drought
- D2 Drought-Severe
- D3 Drought-Extreme
- D4 Drought-Exceptional
- Delineates Overlapping Areas

Drought type: used only when impacts differ

A = Agriculture

W = Water

F = Forest fire danger



Plus (+) = Forecast to intensify next two weeks

Minus (-) = Forecast to diminish next two weeks

No sign = No change in drought classification forecast

• **Updated every Thursday morning** •

1999

| 2001

| 2003

| 2005

| 2007

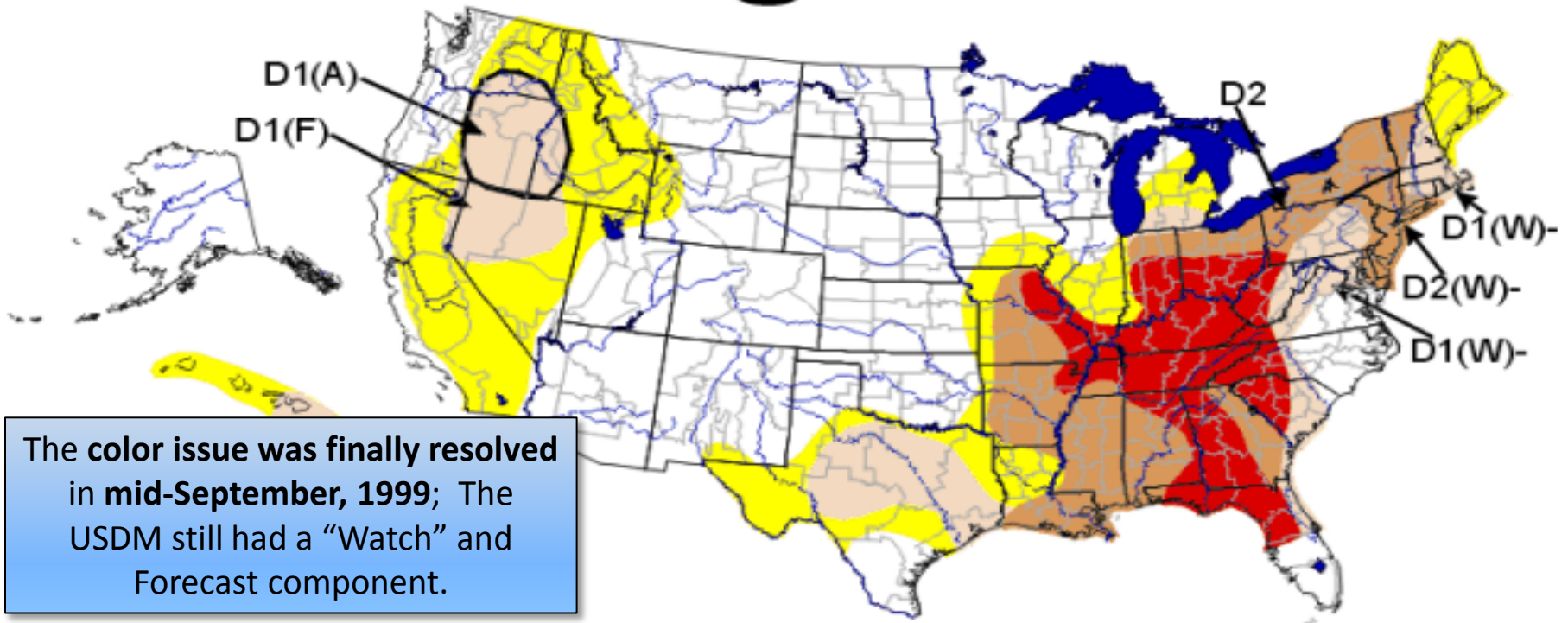
| 2009

| 2011

| 2013

September 15, 1999

U.S. Drought Monitor



- Yellow D0 Watch
- Light Orange D1 Drought
- Medium Orange D2 Drought-Severe
- Red D3 Drought-Extreme
- Dark Red D4 Drought-Exceptional
- Black line Delineates Overlapping Areas

Drought type: used only when impacts differ

A = Agriculture
W = Water
F = Forest fire danger



Plus (+) = Forecast to intensify next two weeks
Minus (-) = Forecast to diminish next two weeks
No sign = No change in drought classification forecast

• Updated every Thursday morning •

1999

2001

2003

2005

2007

2009

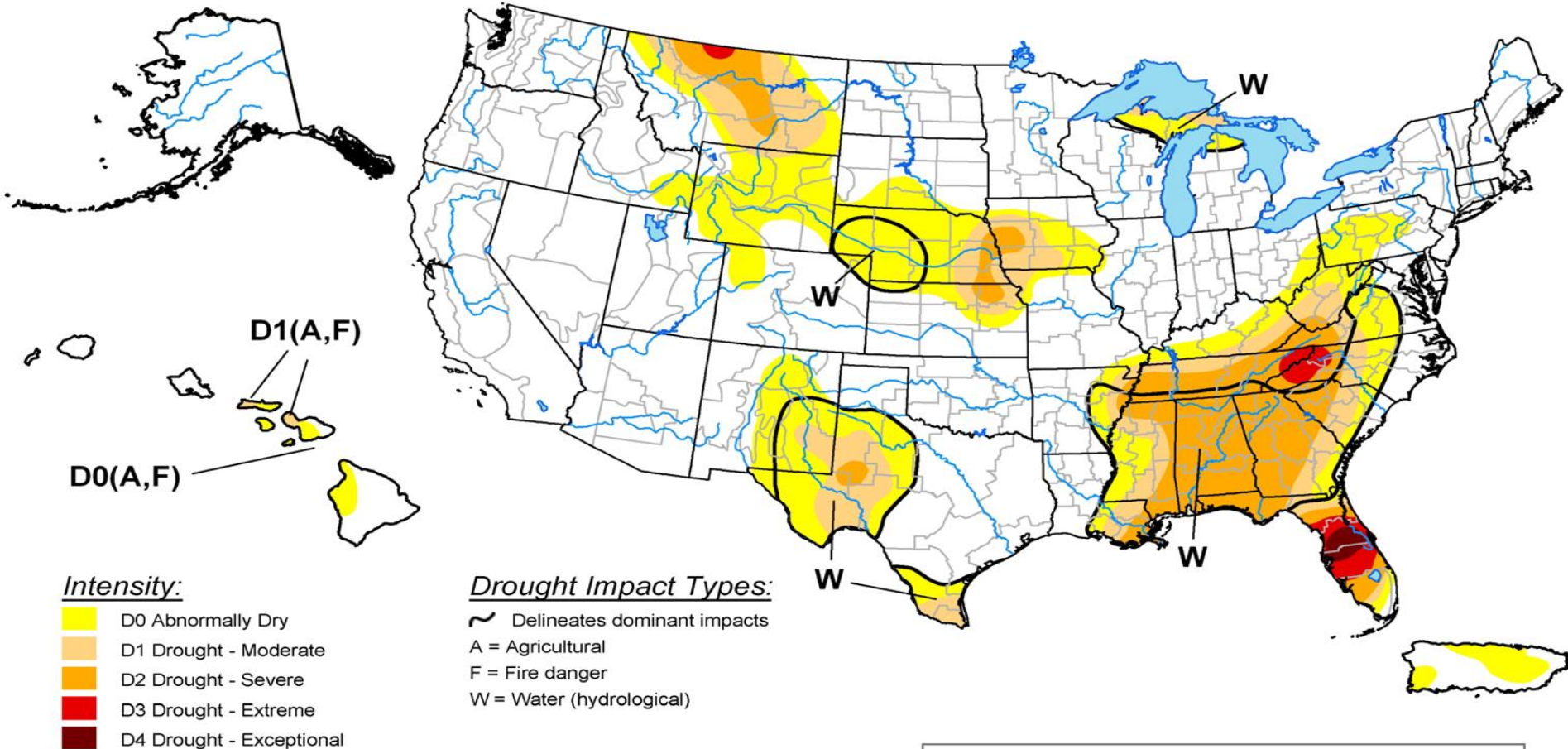
2011

2013

U.S. Drought Monitor

December 12, 2000

Valid 7 a.m. EST



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.



Released Thursday, December 14, 2000

Author: David Miskus, NOAA/CPC/JAWF

1999

2001

2003

2005

2007

2009

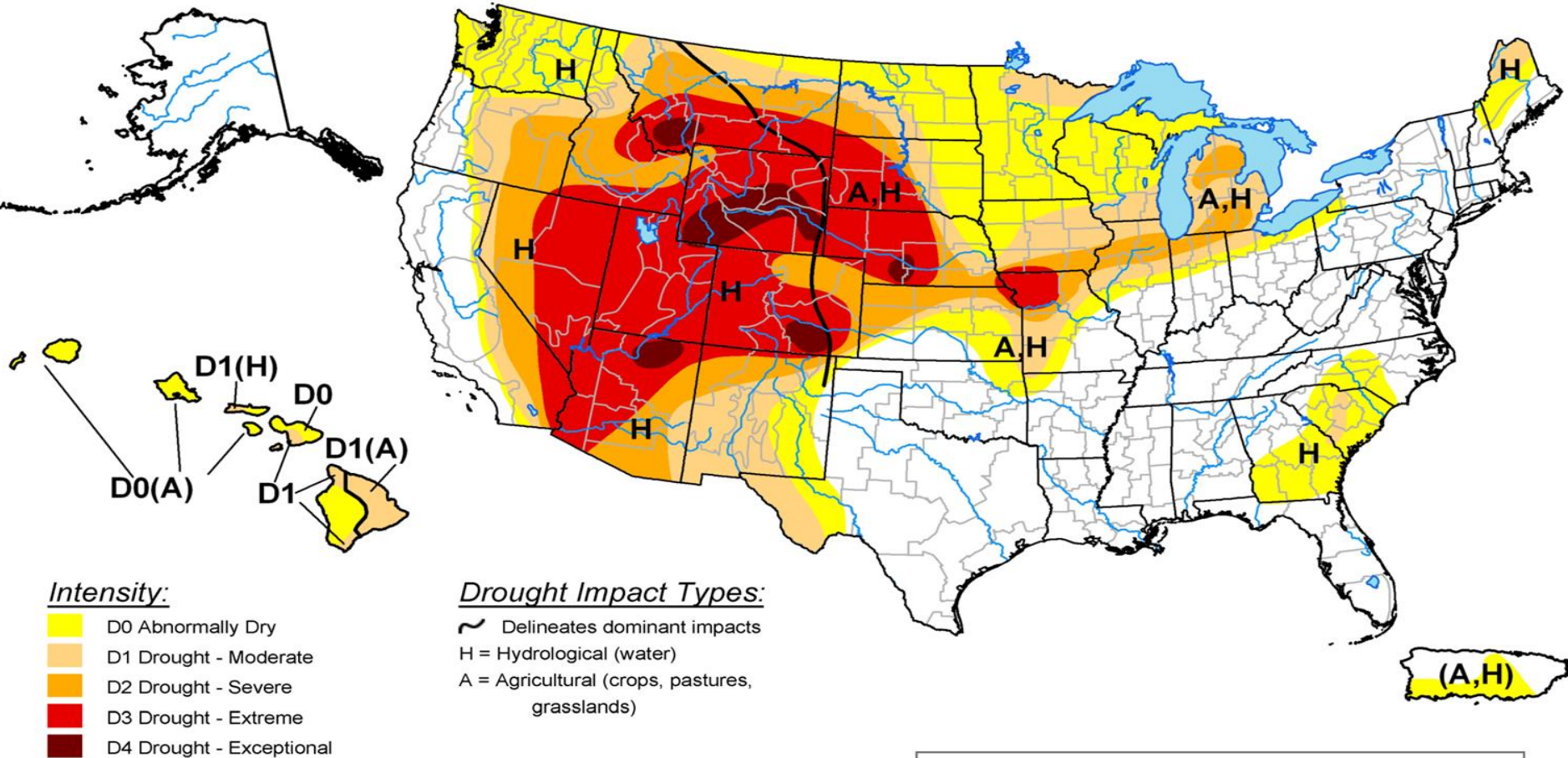
2011

2013

U.S. Drought Monitor

February 18, 2003

Valid 7 a.m. EST



The Fire ("F") Impact type was dropped in early 2003 b/c fire is not really a good drought indicator; too many other factors that have nothing to do with drought can lead to wildfires.

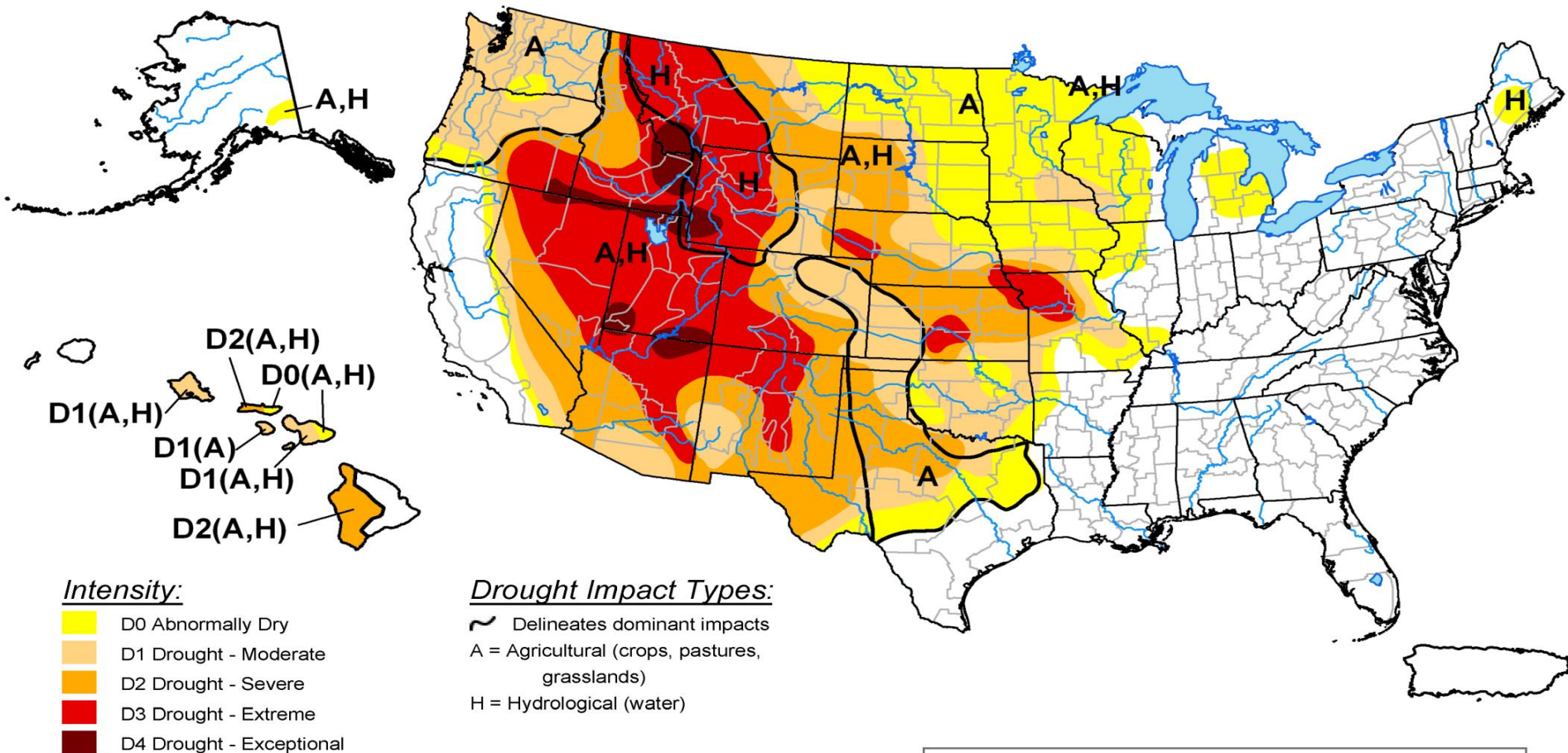


Issued Thursday, February 20, 2003
Daynes, National Drought Mitigation Center

U.S. Drought Monitor

August 19, 2003

Valid 7 a.m. EST



August, 2003 - authors make a transparent switch from CorelDRAW to GIS (Geographic Information System) to create the map. There was a steep learning curve, but made the USDM a leader on the GIS front and would pay big dividends down the road.



Drought Mitigation Center



Thursday, August 21, 2003
/Richard Heim, NOAA/NCDC

1999

2001

2003

2005

2007

2009

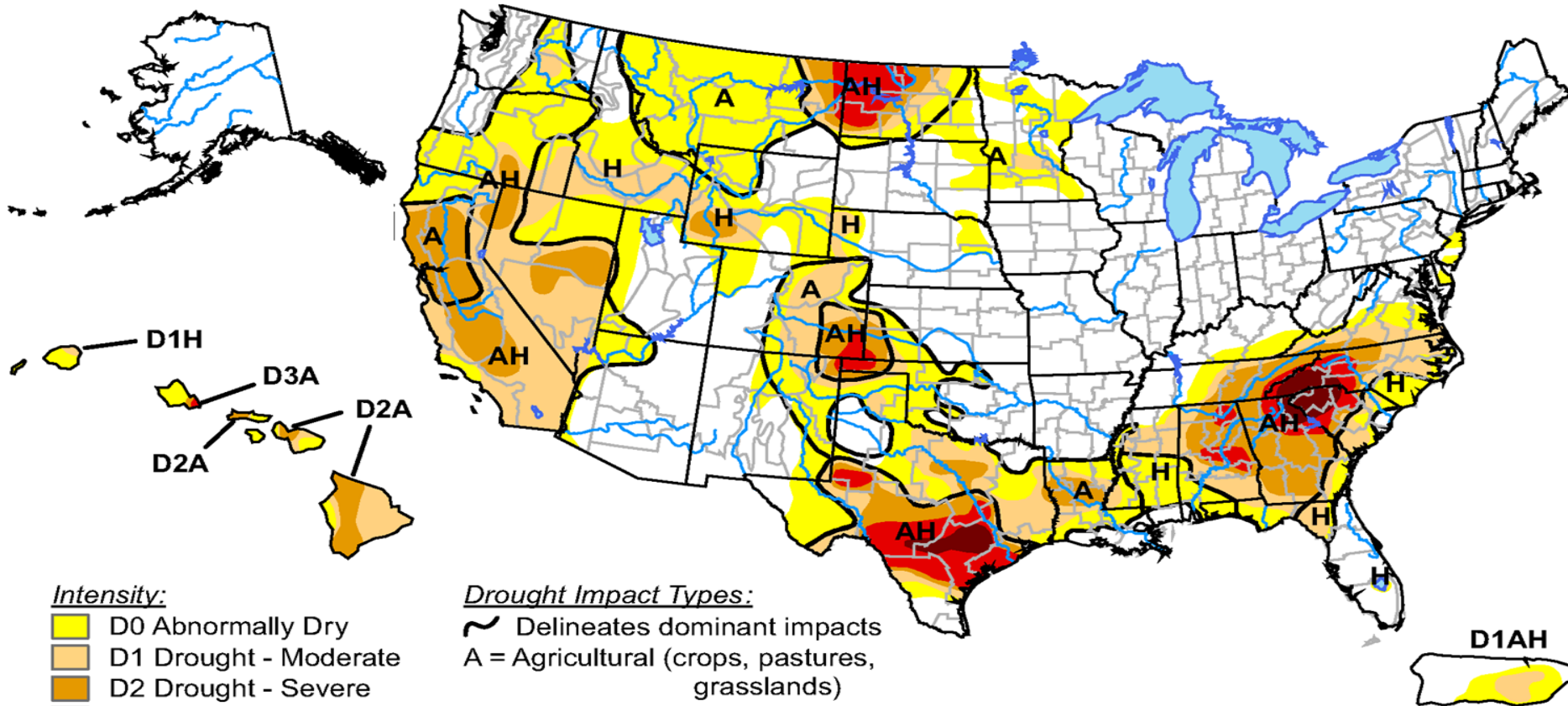
2011

2013

U.S. Drought Monitor

August 12, 2008

Valid 8 a.m. EDT



I joined the USDM team in August, 2008.

for forecast statements.

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



Released Thursday, August 14, 2008

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

1999

2001

2003

2005

2007

2009

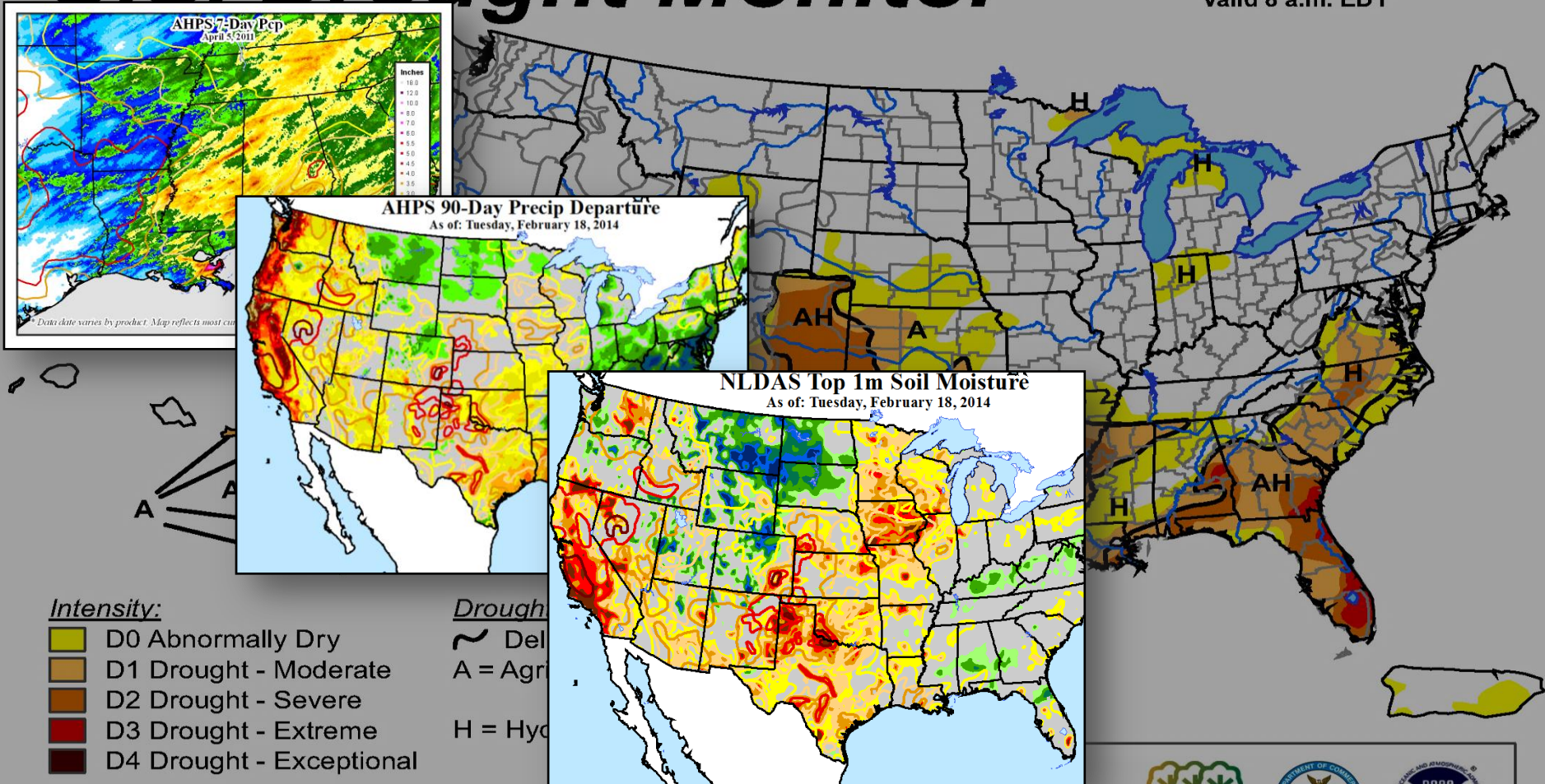
2011

2013

U.S. Drought Monitor

March 22, 2011

Valid 8 a.m. EDT



2008-2011 - Several authors, including yours truly, began incorporating GIS weather and hydrological data directly into the map-editing process; consequently , accuracy and detail increase over the next several years – no more “eyeballing” it!

March 24, 2011
Department of Agriculture

1999

2001

2003

2005

2007

2009

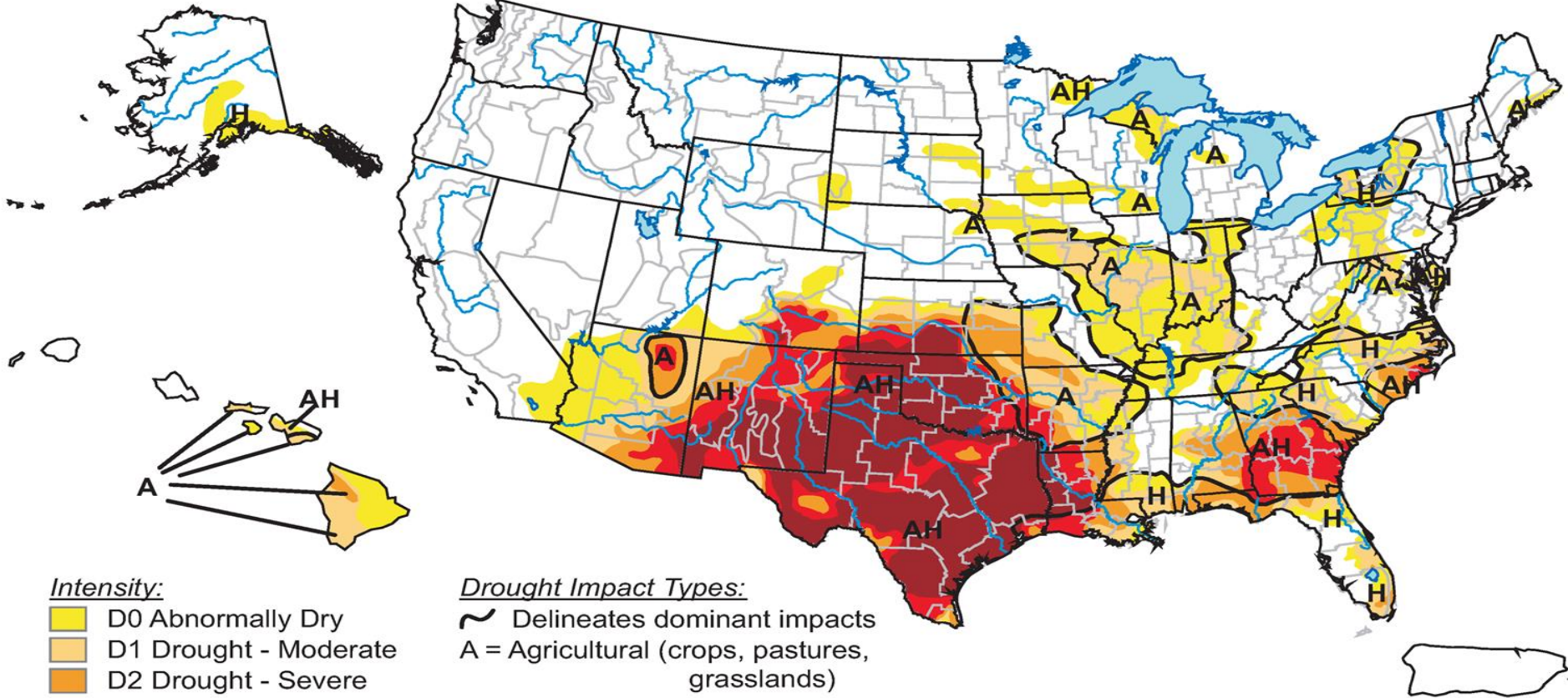
2011

2013

U.S. Drought Monitor

August 23, 2011

Valid 8 a.m. EDT



Not even the famed D.C Earthquake could stop the USDM, which happened to hit on a Tuesday as I was saving Draft 2. Laura (co-author) was not actually my backup; my backup was evacuated with me in D.C..



Released Thursday, August 25, 2011
s: Eric Luebehusen, U.S. Department of Agriculture
Laura Edwards, Western Regional Climate Center

1999

2001

2003

2005

2007

2009

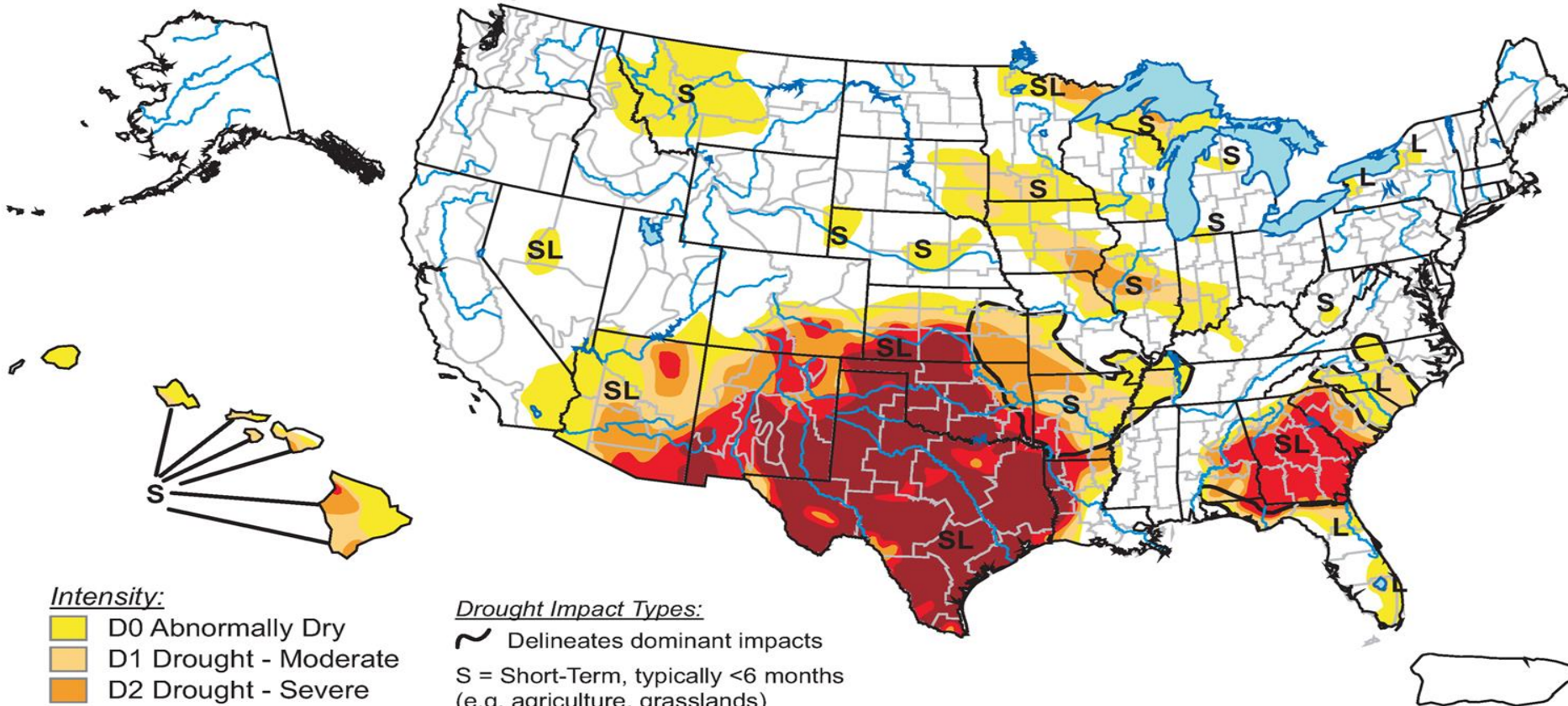
2011

2013

U.S. Drought Monitor

September 27, 2011

Valid 8 a.m. EDT



USDA



1999

2001

2003

2005

2007

2009

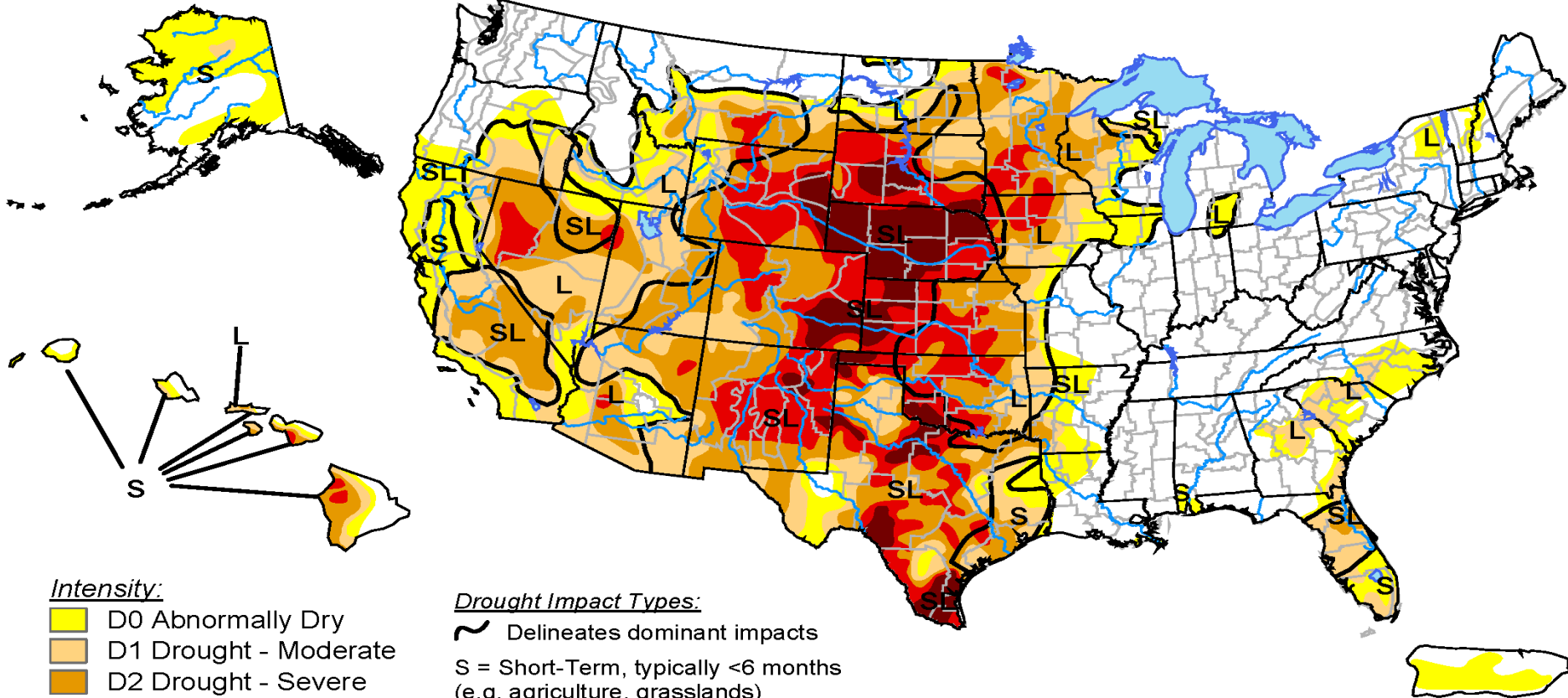
2011

2013

U.S. Drought Monitor

March 26, 2013

Valid 7 a.m. EDT



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)



Released Thursday, March 28, 2013
Author: Anthony Artusa, NOAA/NWS/NCEP/CPC

1999

2001

2003

2005

2007

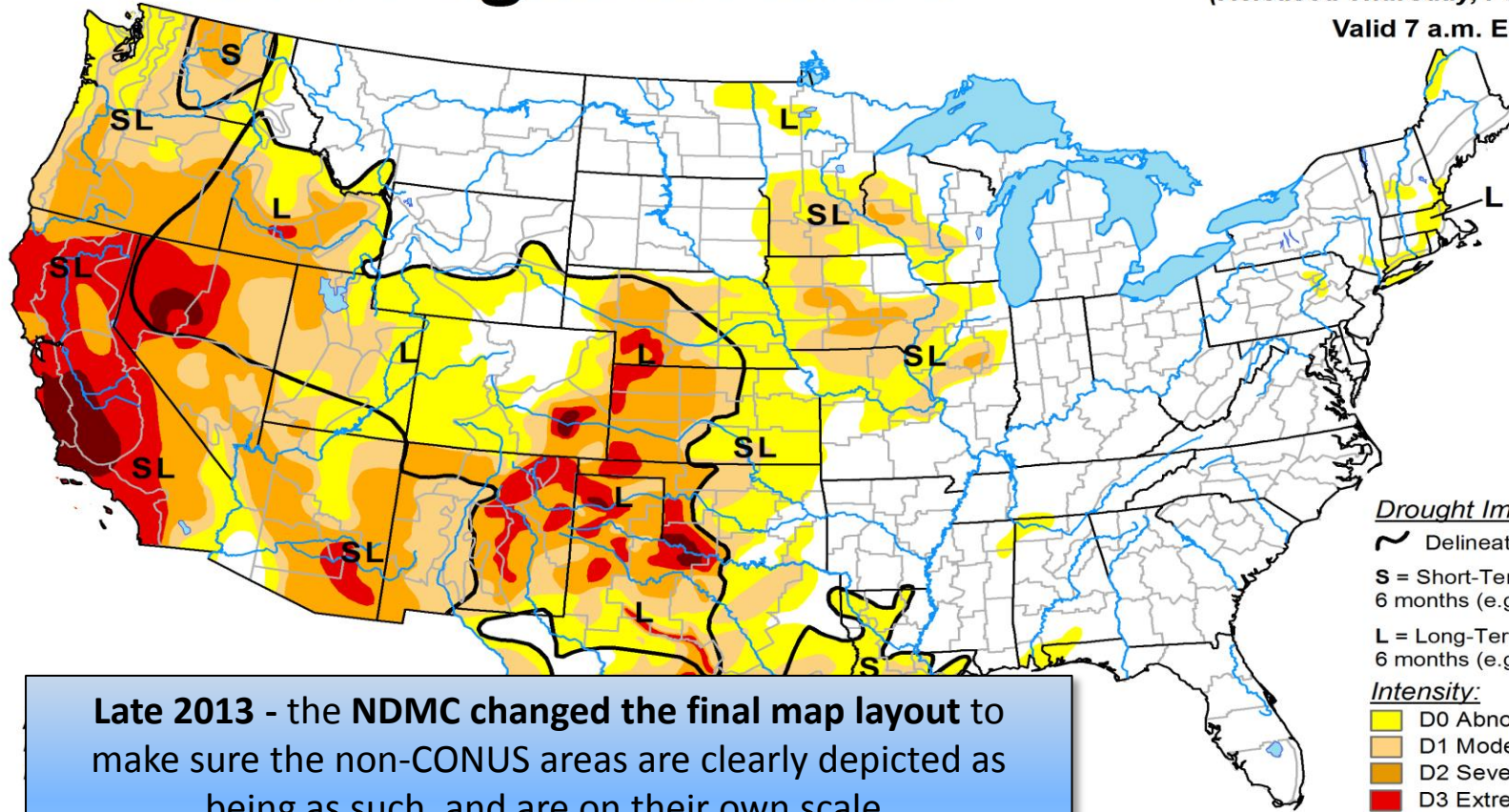
2009

2011

2013

U.S. Drought Monitor

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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.

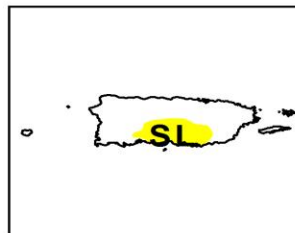
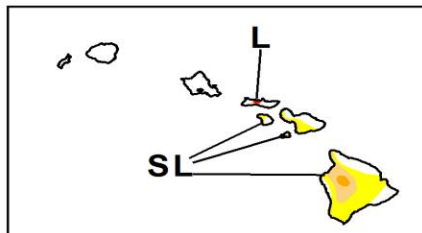
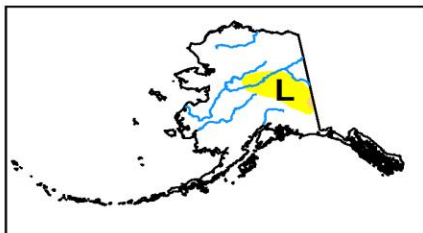
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- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

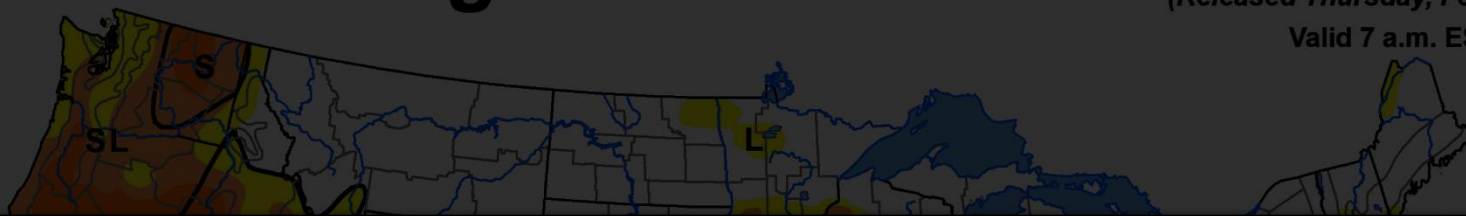
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U.S. Drought Monitor

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Drought Category

Color

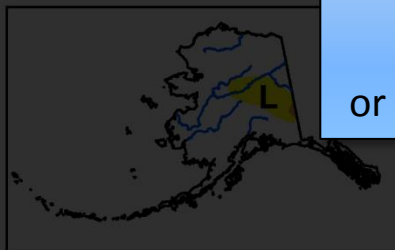
Frequency

- D4, Exceptional Drought:  once per 50 to 100 years
- D3, Extreme Drought:  once per 20 to 50 years
- D2, Severe Drought:  once per 10 to 20 years
- D1, Moderate Drought:  once per 5 to 10 years
- D0, Abnormally Dry:  once per 3 to 5 years

Author:
David Miskus
NOAA/NWS/NCEP/CPC

The drought categories are associated with historical occurrence/likelihood (percentile ranking).

It is not anecdotal or subjective, like *"It's really, really dry!!"*
or *"I don't remember it ever being this dry... we have to be D4!!!"*



<http://droughtmonitor.unl.edu/>

Category	Description	Possible Impacts
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies

Schedule & Process



Requirement: Authors **must** work at a regional or national “center”, government or academia/research
 There are currently 11 authors, and all are ***volunteers***.



Agricultural Weather Assessments
 World Agricultural Outlook Board

January						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

February						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

March						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

April						
Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May						
Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

June						
Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

July				
Su	Mo	Tu	We	Th
	1	2	3	4
7	8	9	10	11
14	15	16	17	18
21	22	23	24	25
28	29	30	31	

August						
--------	--	--	--	--	--	--

September				
Tu	We	Th	Fr	Sa
3	4	5	6	7
10	11	12	13	14
17	18	19	20	21
24	25	26	27	28

The authors takes 2-week turns, altho cases arise where they do a 3-week shift.
The reason: After two weeks, you are spent.
Each author typically has two 2-week shifts per year.

October						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

December						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

January						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

February						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

March						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

April						
Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May						
Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

June						
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9	10	11	12	13	14	15
16	17	18	19	20	21	22
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30						

July				
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7	8	9	10	11
14	15	16	17	18
21	22	23	24	25
28	29	30	31	

August				
Su	Mo	Tu	We	Th

September				
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3	4	5	6	7
10	11	12	13	14
17	18	19	20	21
24	25	26	27	28

October						
Su	Mo	Tu	We	Th	Fr	Sa
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13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November						
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24	25	26	27	28	29	30

December						
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15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

The authors takes 2-week turns, altho cases arise where they do a 3-week shift.

The reason: After two weeks, you are spent.

Each author typically has two 2-week shifts per year.

January						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

February						
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					1	2
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17	18	19	20	21	22	23
24	25	26	27	28		

March						
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31						

April						
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7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May						
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June						
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

July		
Su	Mo	Tu
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14	15	16
21	22	23
28	29	30

The ongoing joke for the authors:
*You can count on death, taxes, and **never** getting out of your USDM shift.*

You can put it off, but you **will** do your time!
 Our scheduler, Dave Miskus at NWS-CPC, makes sure of it!!

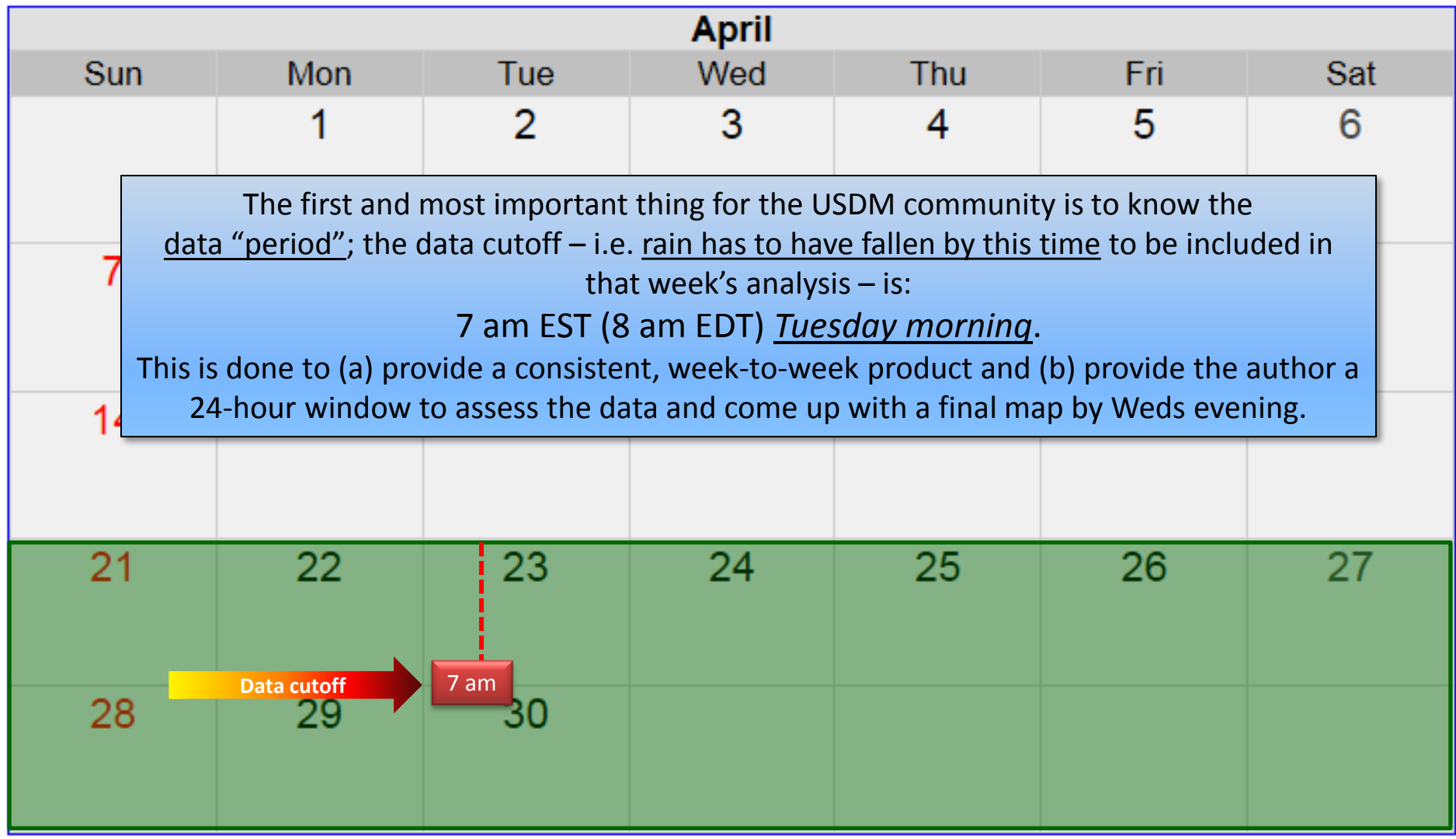
Th	Fr	Sa
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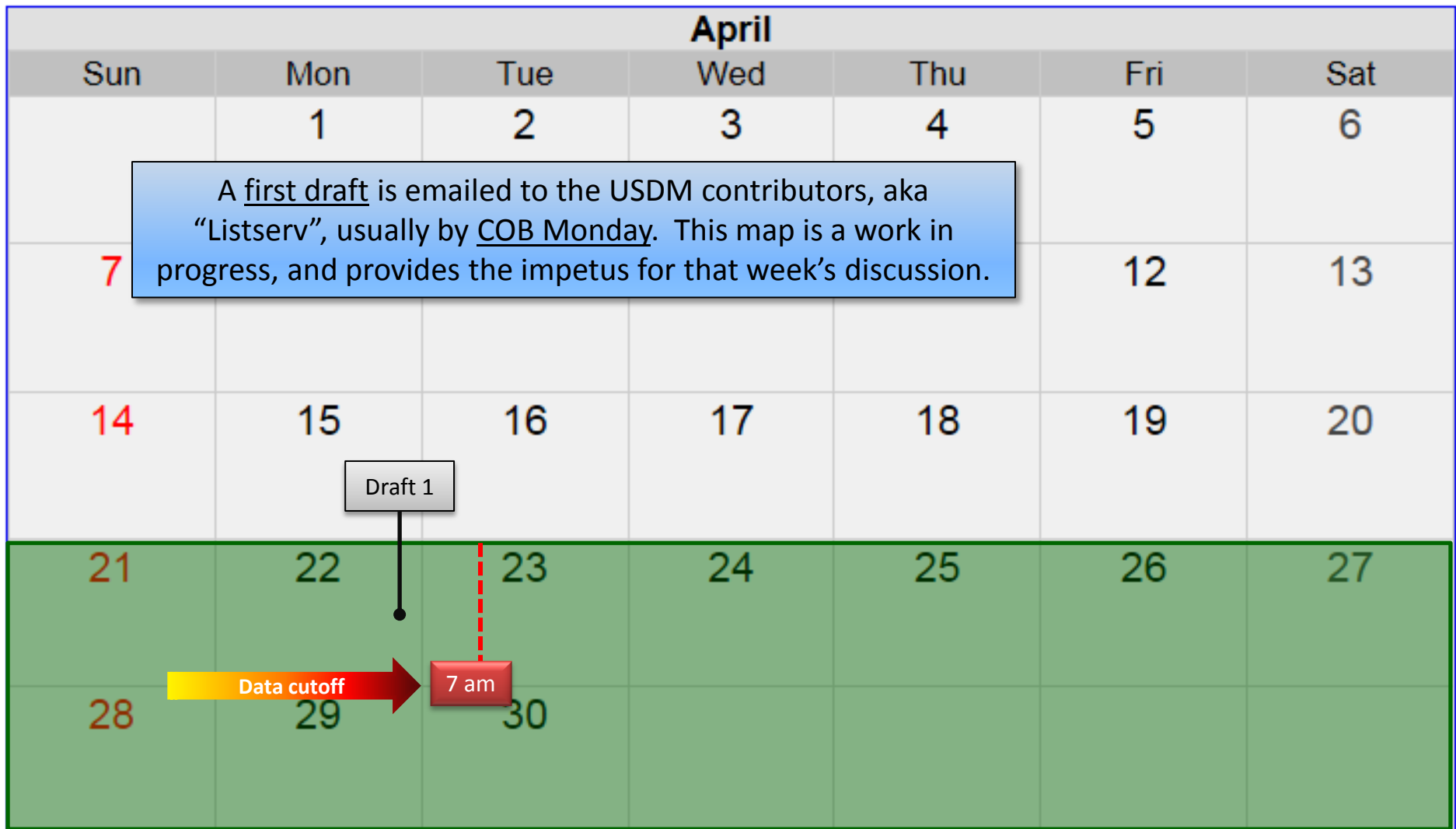
October						
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20	21	22	23	24	25	26
27	28	29	30	31		

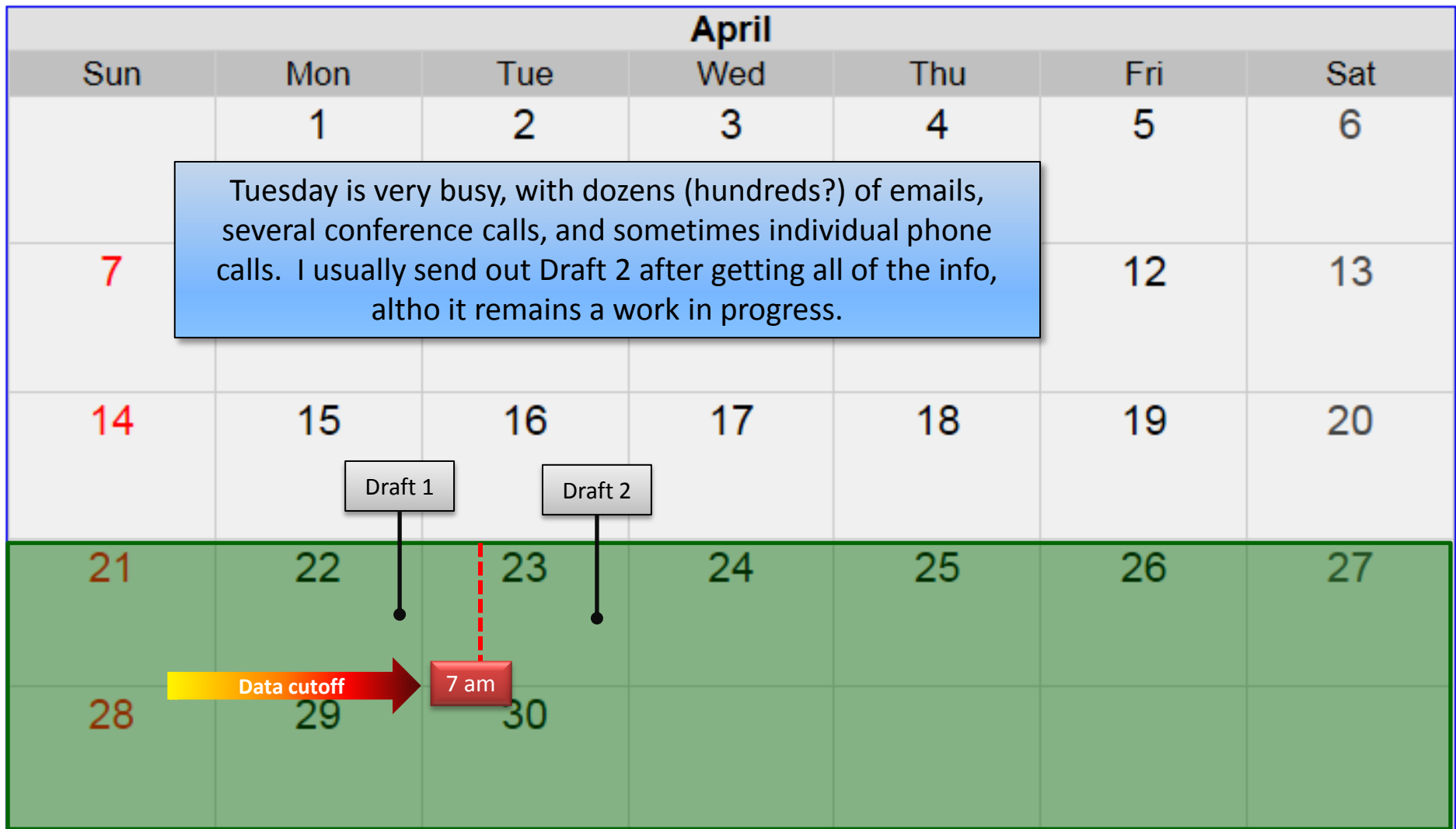
November						
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10	11	12	13	14	15	16
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December						
Su	Mo	Tu	We	Th	Fr	Sa
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8	9	10	11	12	13	14
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22	23	24	25	26	27	28
29	30	31				

April						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	<div>The two-week shift is broken down into two separate weekly cycles, with deadlines set in stone, except for Thanksgiving and any potential major holiday which happens to fall on the official release day.</div>					12
14						13
	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	Luebehusen			







April

Sun

Mon

Tue

Wed

Thu

Fri

Sat

1

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4

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7

By Noon, EST Weds, we send out a near-final draft, and we close the door on changes to the map ~ 2 pm, EST. Sometimes late, key input will make the cut... and before we finalize, we send out any updates in subsequent drafts, but 2 pm is our “it’ll have to wait until next week” deadline.

12

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Draft 1

Draft 2

Draft 3

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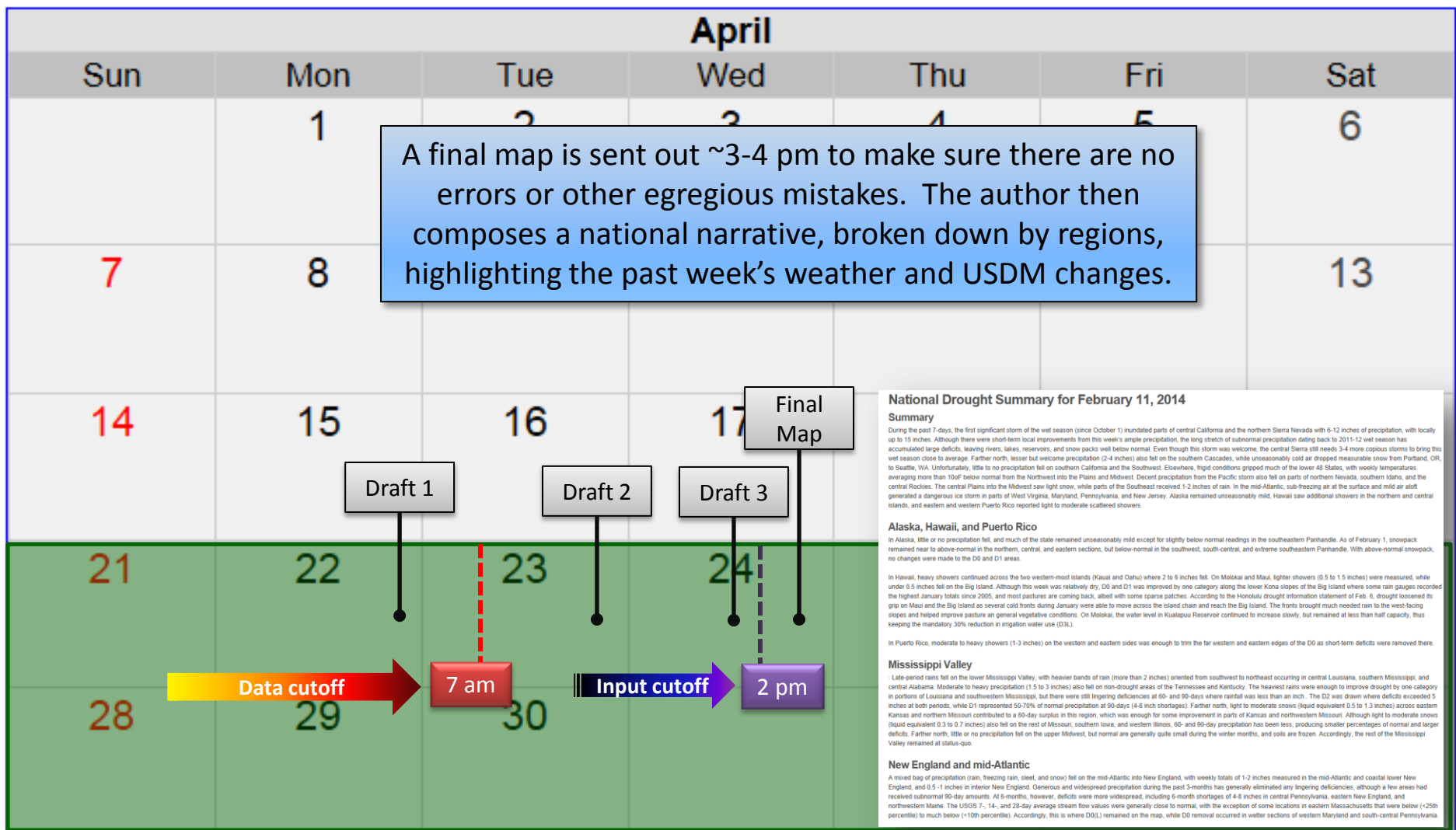
30

Data cutoff

7 am

Input cutoff

2 pm



April

Sun

Mon

Tue

Wed

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Draft 1

Draft 2

Draft 3

Final Map

Final Files Sent

21

22

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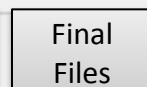
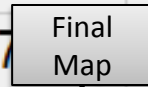
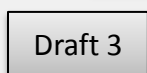
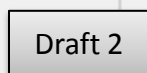
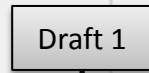
Data cutoff

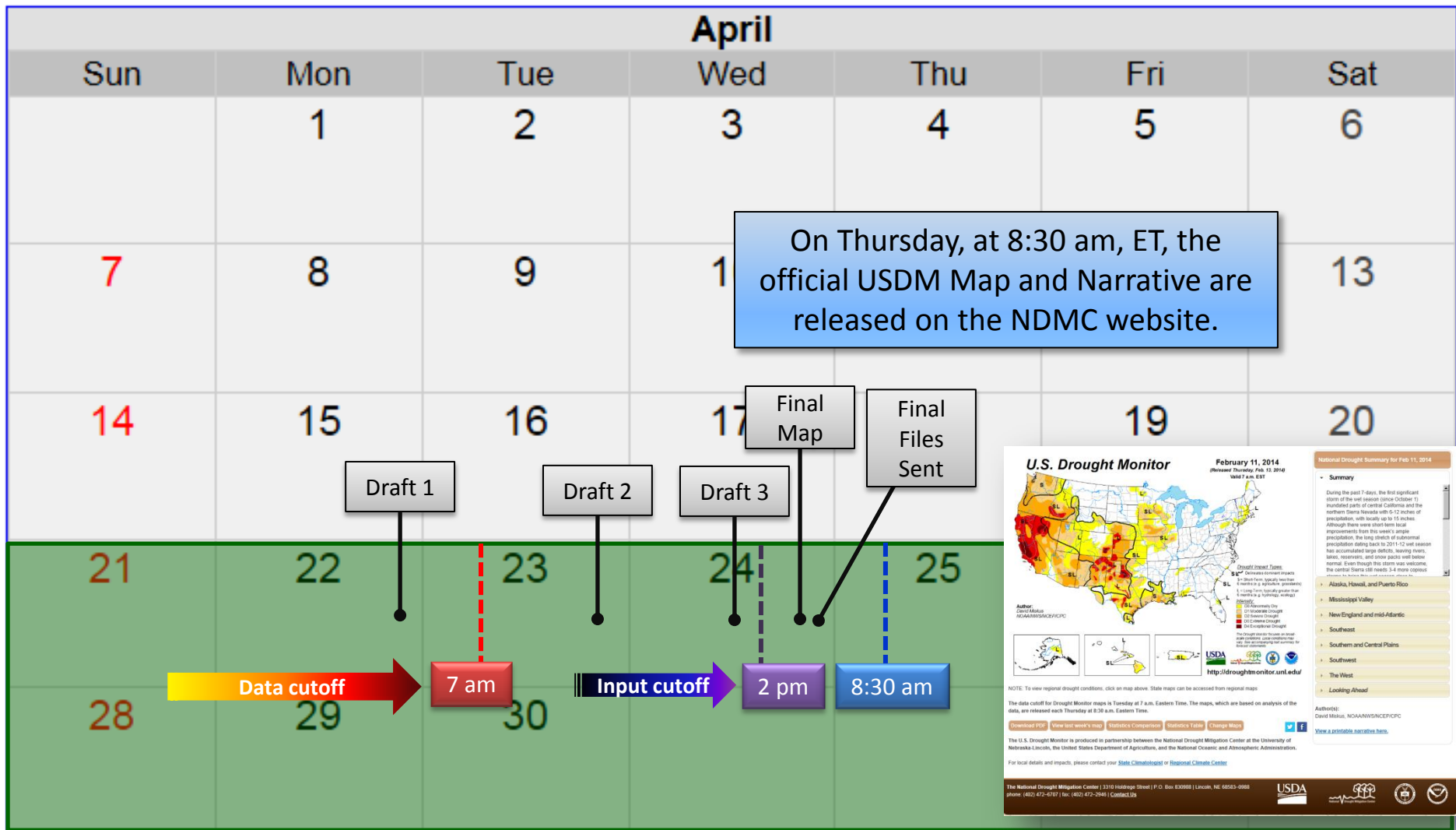
7 am

Input cutoff

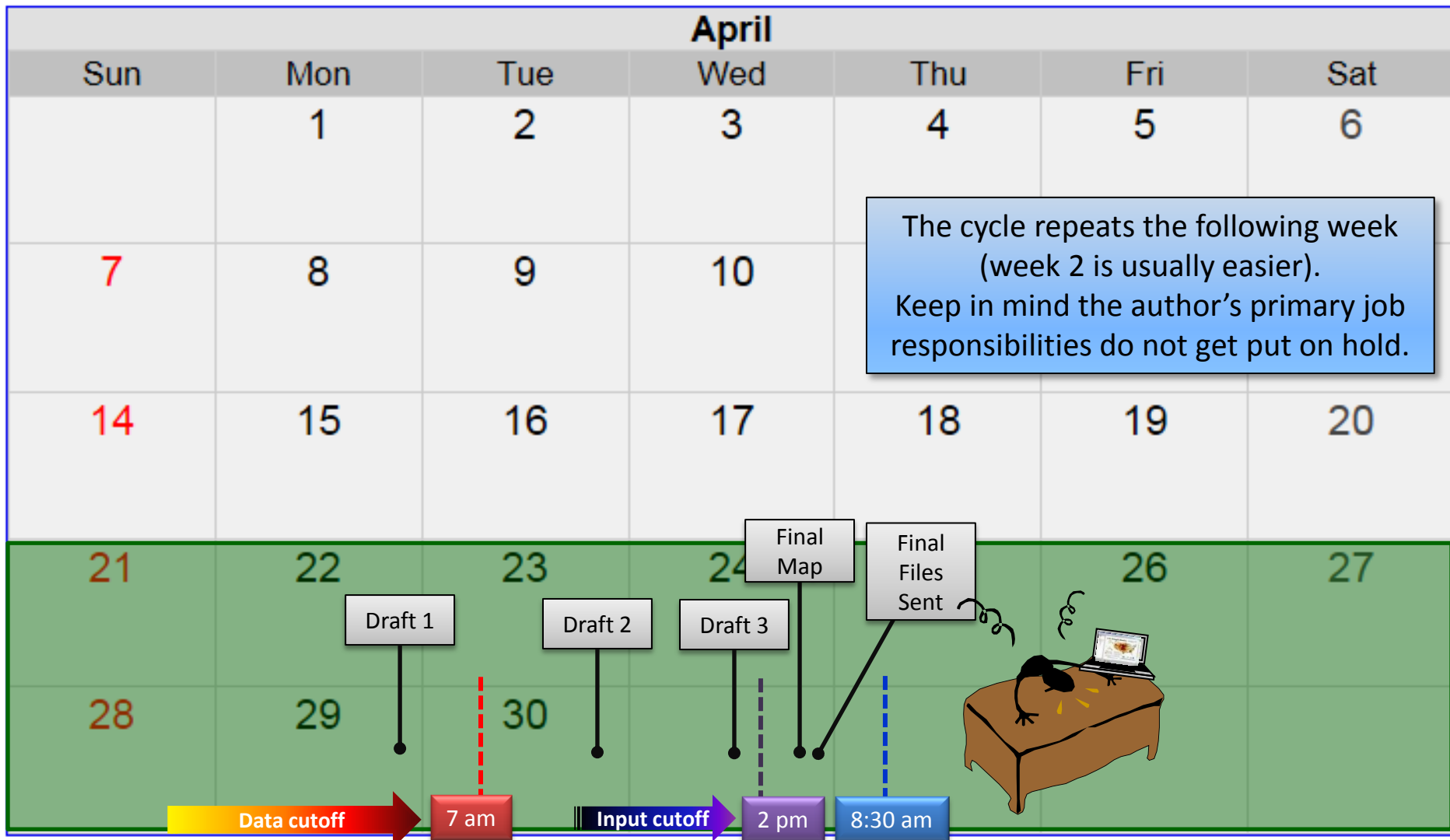
2 pm

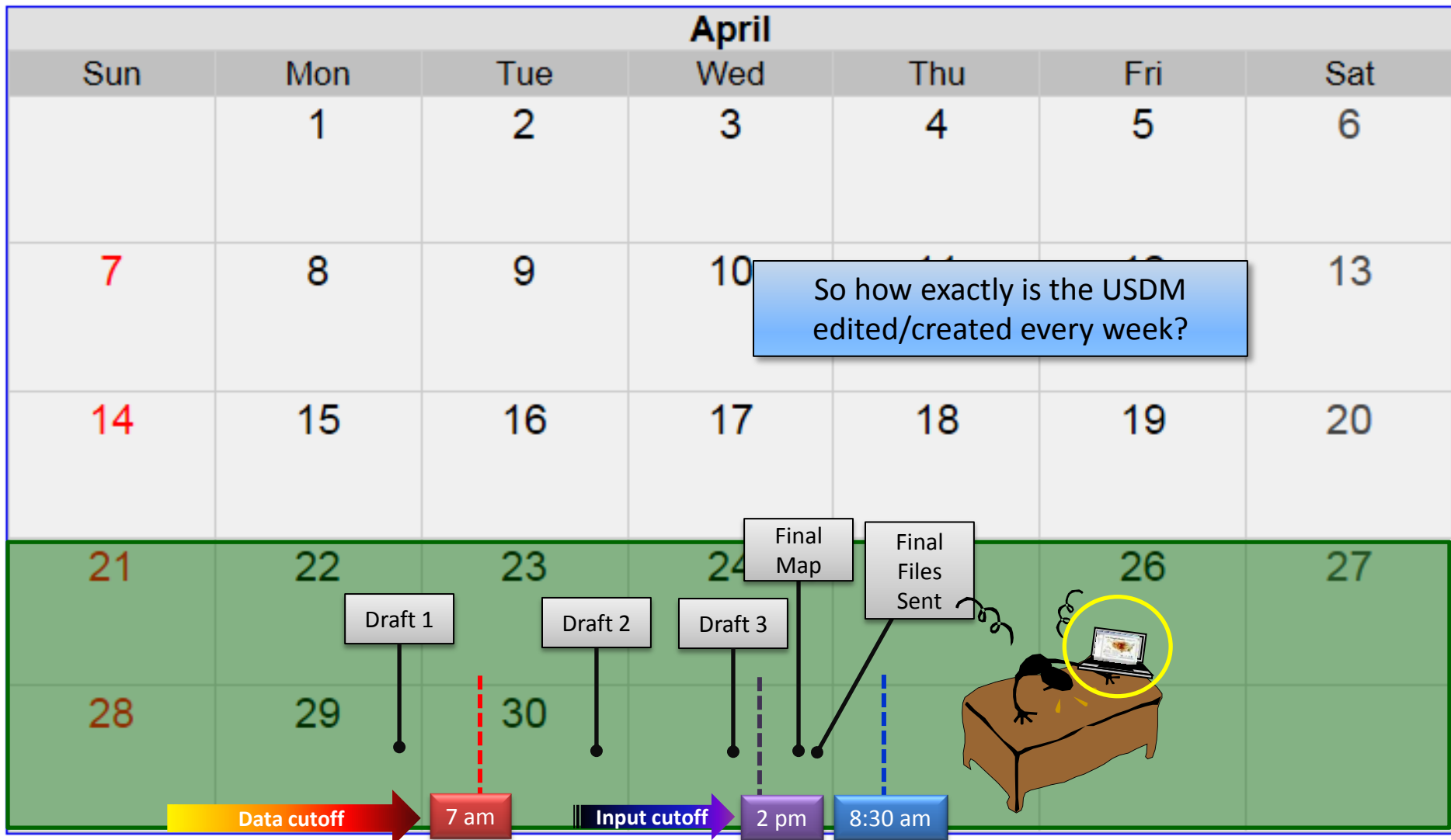
By 5 pm EST on Weds, all the files are compressed and sent to the Drought Mitigation Center, who then confirms receipt before the author is free to go.

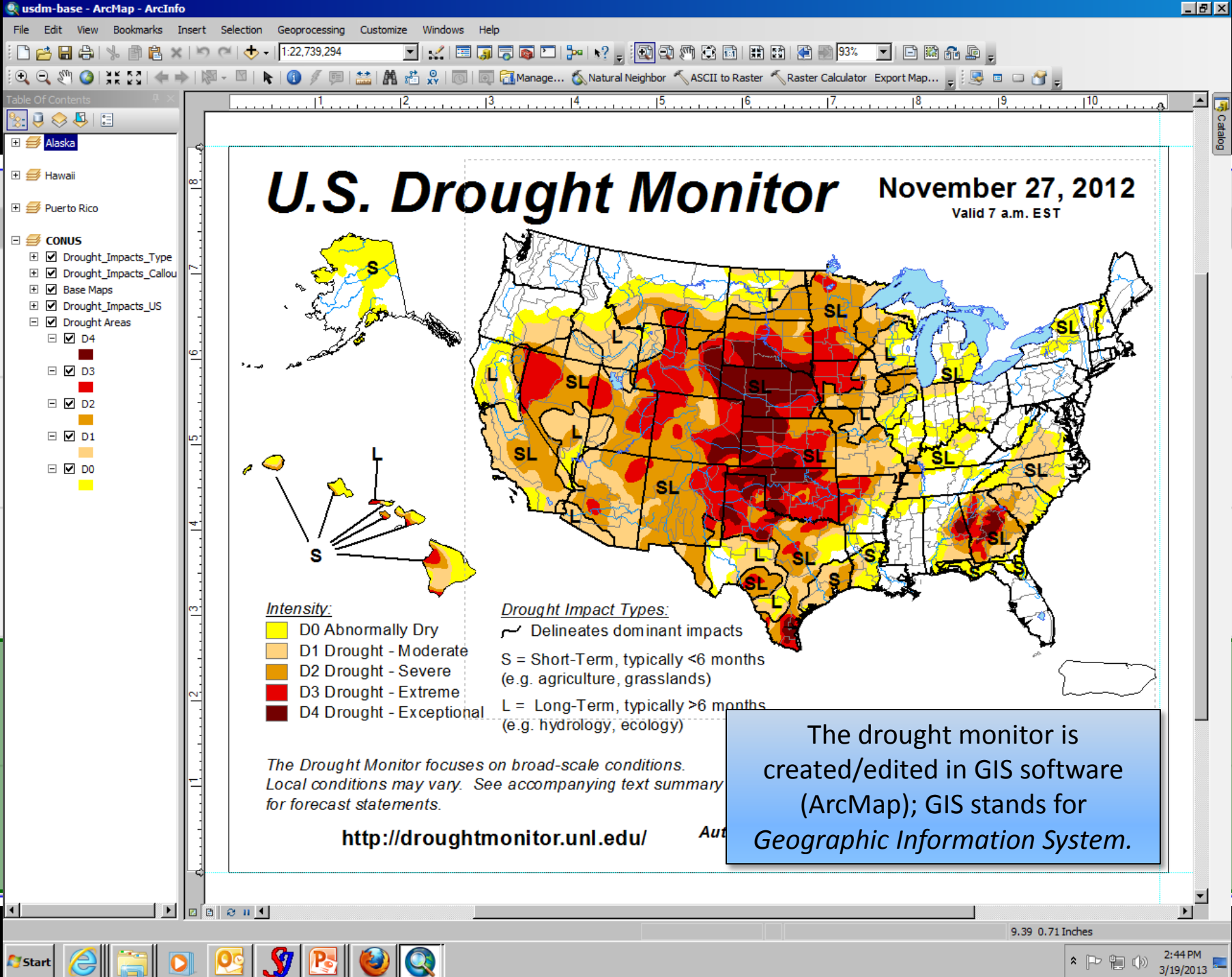


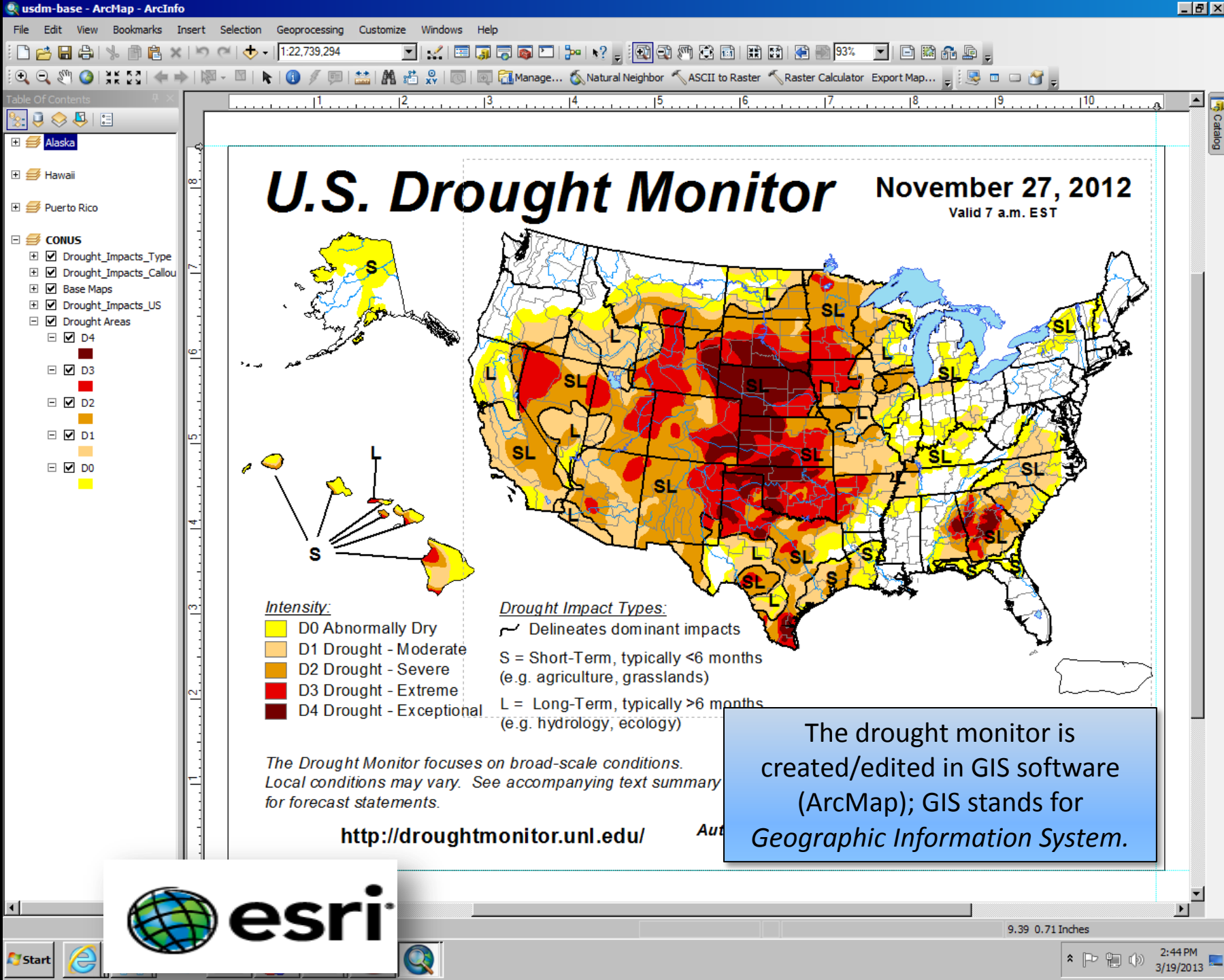


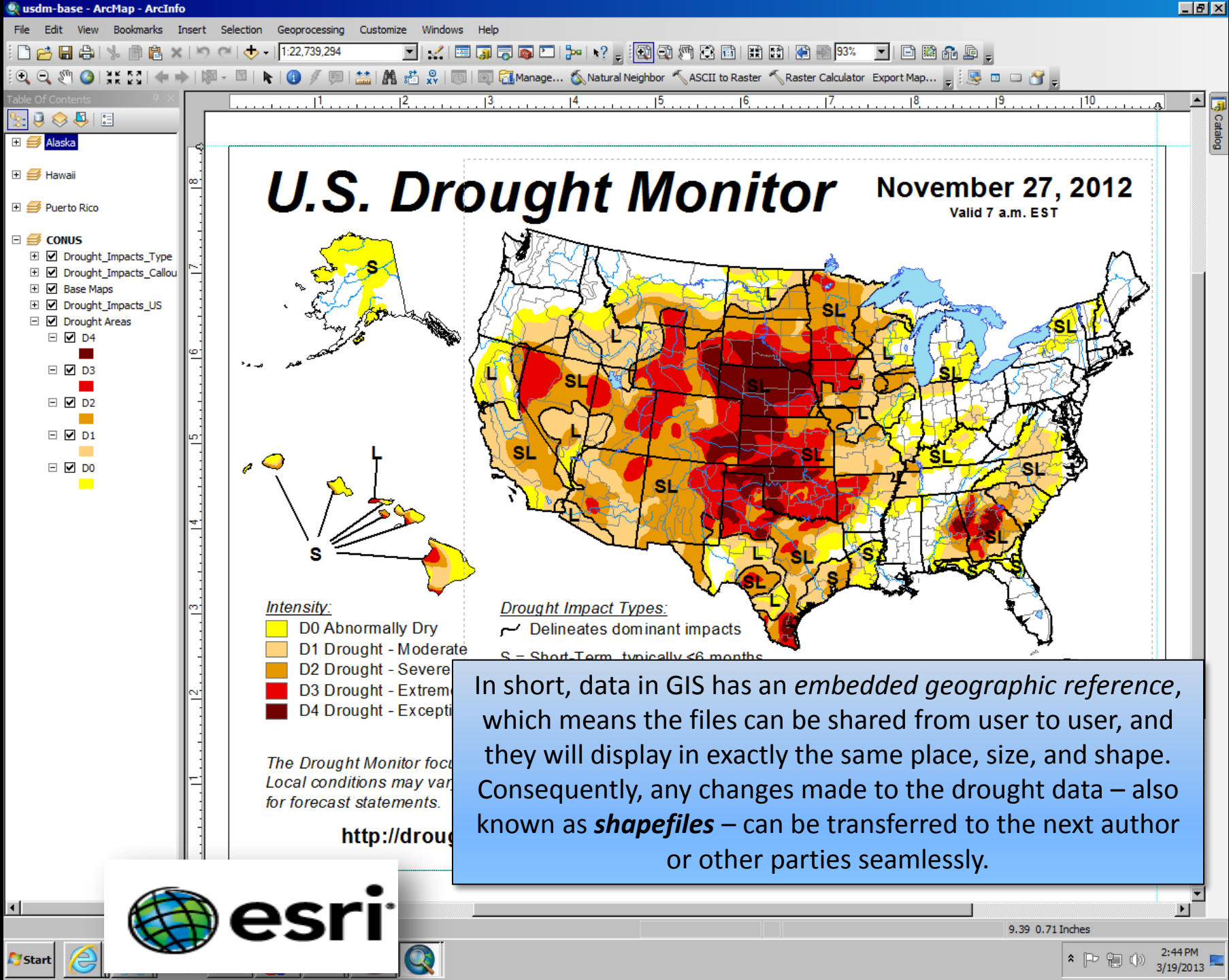
<http://droughtmonitor.unl.edu/>







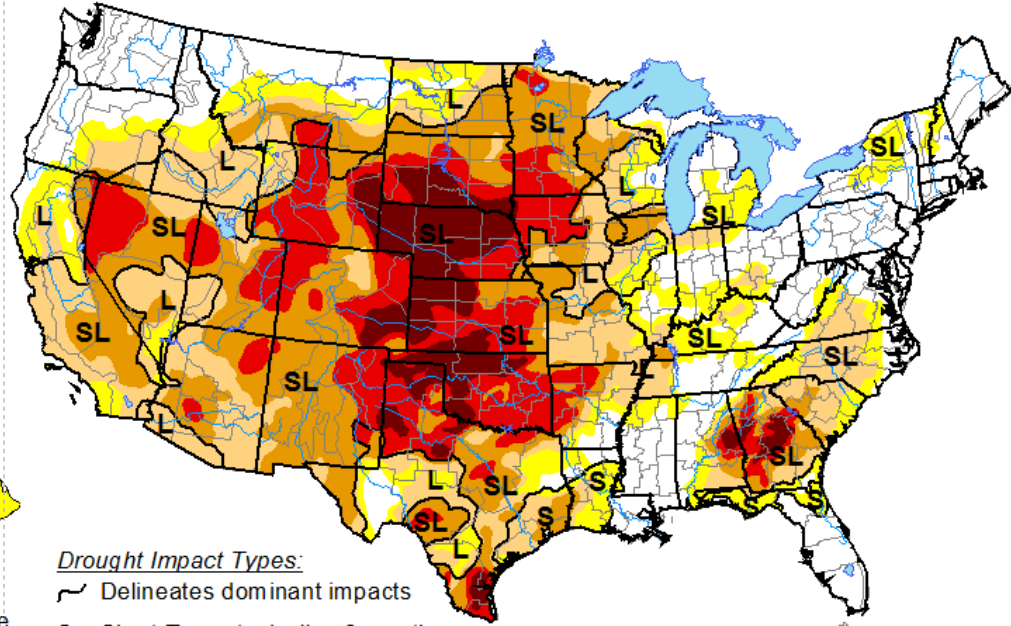




U.S. Drought Monitor

November 27, 2012

Valid 7 a.m. EST



Drought Impact Types:

~ Delineates dominant impacts

S = Short-Term, typically <6 months

☒ Drought Areas

☒ D4

☒ D3

☒ D2

☒ D1

☒ D0

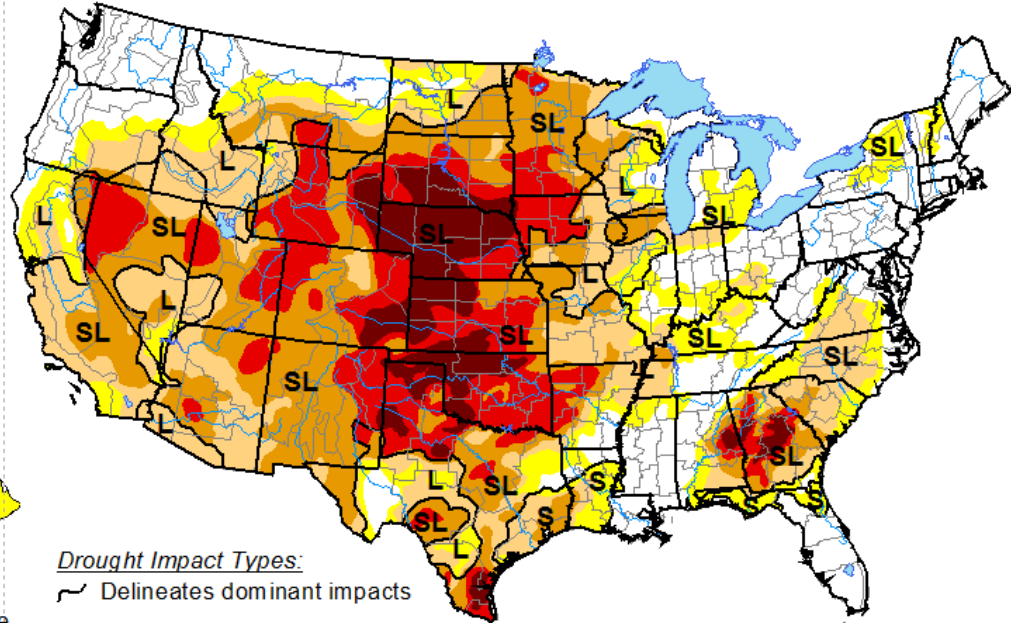
The drought areas, or **drought shapefiles**, are actually 5 separate drought files which are overlaid on top of each other to give the illusion of one “drought map”; We are actually editing 5 different drought files.

As authors, we need to be VERY careful when hitting DELETE; There is NO UNDO DELETE option in GIS if you hit [SAVE]!!!

U.S. Drought Monitor

November 27, 2012

Valid 7 a.m. EST



Drought Impact Types:

~ Delineates dominant impacts

S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)

Locally Dry
ht - Moderate
ht - Severe
ht - Extreme
ht - Extreme

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One big advantage of editing the drought areas in GIS is there is a ***wealth of weather and hydrological data also available in GIS format***; we can bring the data directly into the “Drought Monitor” to assist with the final drought depiction. More on this later.

Drought Areas

☒ D4

☒ D3

☒ D2

☒ D1

☒ D0

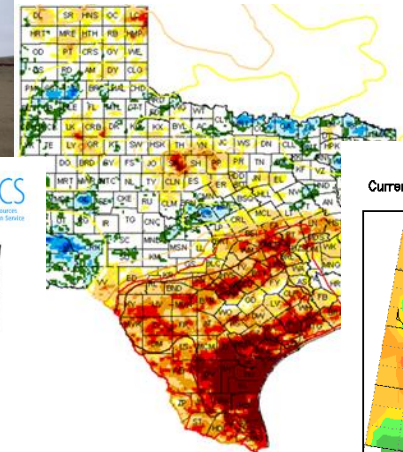
The Importance of Local Expert Input

- The U.S. Drought Monitor Team Relies on Field Observation Feedback from the Local Experts for Impacts Information & “Ground Truth”

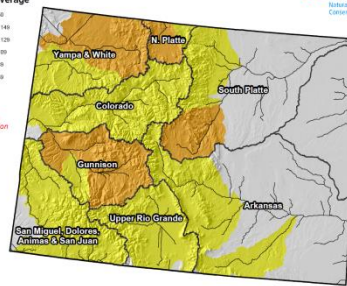
– **Listserver (~350 Participants: 2/3 Federal, 1/3 State/Univ.)**

- Local NWS & USDA/NRCS Offices
- State Climate Offices
- State Drought Task Forces
- Regional Climate Centers

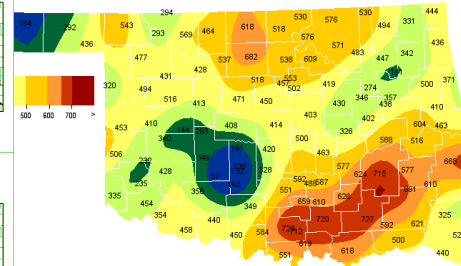
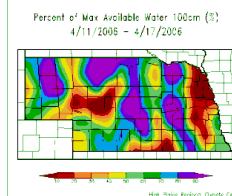
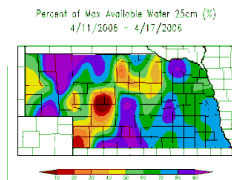
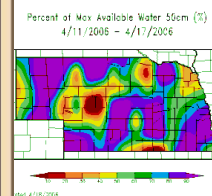
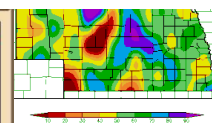
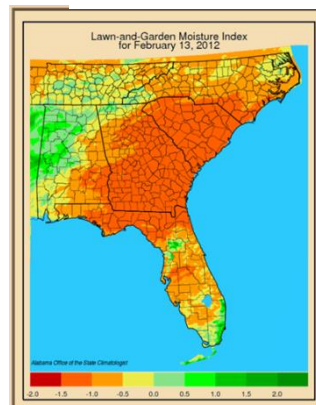
The primary means of communication with our “eyes in the field” is thru email; The email “Group” is called the **USDM Listserver**



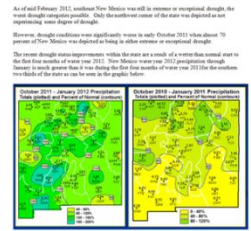
Colorado Streamflow Forecast Map



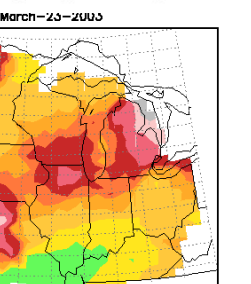
Current as of February 1, 2012



Keetch-Byram Drought Index as of Sep 18, 2006



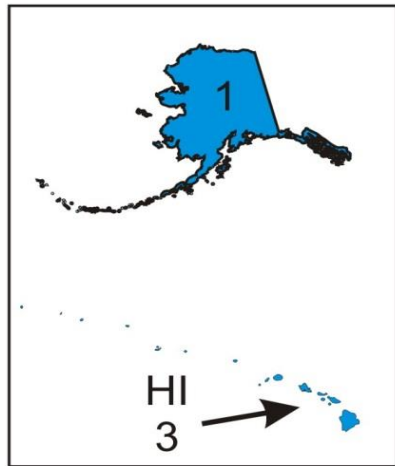
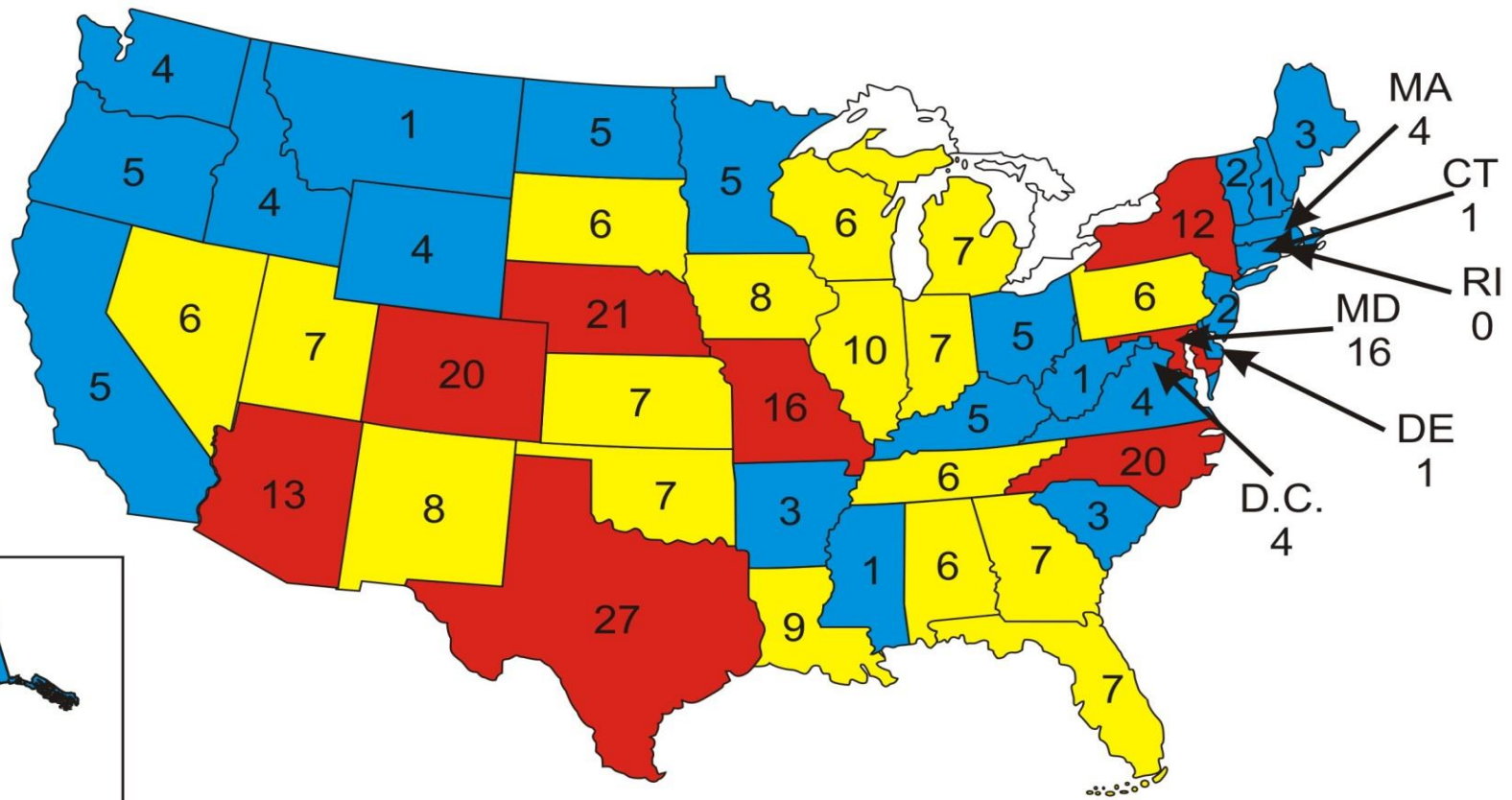
Looking at water year 2012 precipitation totals October 2011 through January 2012, some precipitation deficits are noted, but there were generally less significant deficits than 2011.



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USDM Listserve Subscribers

(as of November 1, 2013)



- 1-5 participants
- 6-10 participants
- 11+ participants

All states now have at least 1 "official" participant except Rhode Island.

Total: 345 (does not include 1 participant from Canada)

From	Subject	Received	S...	Cat...
Eric Oglesby - NOAA Fed...	Re: Florida Discussion	Tue 11/27/2012 12...	6..	
Victor Murphy NOAA Fe...	GA: one more suggest--Monroe Co	Tue 11/27/2012 12...	3..	
John Nielsen-Gammon	Re: [DROUGHT] Draft 1 - TX	Tue 11/27/2012 12...	1..	
Steven Fleegel - NOAA F...	Re: [DROUGHT] Draft 1 - All	Tue 11/27/2012 12...	2..	
Zierden, David	Florida Discussion	Tue 11/27/2012 12...	5..	
Victor Murphy NOAA Fe...	Re: Florida Discussion	Tue 11/27/2012 12...	1..	
John Nielsen-Gammon	Re: TX Panhandle Drought...for Next Week...	Tue 11/27/2012 11...	3..	
Steven Fleegel - NOAA F...	Re: [DROUGHT] Draft 1 - All	Tue 11/27/2012 11...	1..	
Victor Murphy NOAA Fe...	Re: [DROUGHT] GA Drought Photos (impacts)	Tue 11/27/2012 11...	6..	
Brian Fuchs	RE: [DROUGHT] GA Drought Photos (impacts)	Tue 11/27/2012 11...	4..	
Victor Murphy NOAA Fe...	Re: [DROUGHT] GA Drought Photos (impacts)	Tue 11/27/2012 11...	3..	
Gary McManus	Re: [DROUGHT] GA Drought Photos (impacts)	Tue 11/27/2012 11...	1..	
Victor Murphy NOAA Fe...	Re: [DROUGHT] Logistics	Tue 11/27/2012 11...	1..	
Victor Murphy NOAA Fe...	TX Panhandle Drought...for Next Week...	Tue 11/27/2012 11...	2..	
Brian Fuchs	Re: [DROUGHT] percent of Missouri and Uppe...	Tue 11/27/2012 10...	4..	
Brian Fuchs	Re: [DROUGHT] percent of Missouri and Uppe...	Tue 11/27/2012 10...	2..	
Johnson, Angel - NASS				
Bill Lawrence - NOAA Fe...				
Victor Murphy NOAA Fe...				
Gary McManus				
Kristopher White - NOA...				
Al Sandrik				
Ray Wolf - NOAA Federal				
Bill Lawrence - NOAA Fe...	Re: [DROUGHT] Logistics	Tue 11/27/2012 9:...	2..	
Nielsen-Gammon, John W	Re: [DROUGHT] Draft 1 - TX	Tue 11/27/2012 9:...	1..	
Shaughnessy, Geoff	RE: D0 for South Florida	Tue 11/27/2012 9:...	8..	
John Christy	AL DM Team for 27 Nov: No. 2	Tue 11/27/2012 8:...	2..	
Patricia Tanner - NOAA F...	Re: [DROUGHT] Draft 1 - All	Tue 11/27/2012 7:...	2..	
Barry Baxter - NOAA Fed...	Re: D0 for South Florida	Tue 11/27/2012 7:...	2..	
Zimmer, Edward (EEC)	Re: Draft 1 Partial	Mon 11/26/2012 8:...	2..	
Mark Shafer	Re: [DROUGHT] OK wheat in desperate need ...	Mon 11/26/2012 6:...	1..	
Eric Oglesby - NOAA Fed...	Re: Time for FL Drought Krewe to Reassemble...	Mon 11/26/2012 6:...	5..	
Victor Murphy NOAA Fe...	Re: [DROUGHT] DM Overlays Updated	Mon 11/26/2012 6:...	1..	
Victor Murphy NOAA Fe...	Fwd: Re: [DROUGHT] Draft 1 Partial (TX)	Mon 11/26/2012 5:...	2..	
Nancy Selover	RE: [DROUGHT] Draft 1 Partial	Mon 11/26/2012 4:...	2..	
Ray Wolf - NOAA Federal	Re: [DROUGHT] Draft 1 Partial	Mon 11/26/2012 4:...	1..	
Mary Knapp	Re: [DROUGHT] Draft 1 Partial	Mon 11/26/2012 4:...	1..	
Mary Knapp	Re: [DROUGHT] Draft 1 Partial	Mon 11/26/2012 4:...	1..	
Zimmer, Edward (EEC)	RE: Draft 1 Partial	Mon 11/26/2012 4:...	2..	
russell.martin	Re: [DROUGHT] Draft 1 Partial	Mon 11/26/2012 3:...	1..	
Akyuz, Adnan	Re: [DROUGHT] Draft 1 Partial	Mon 11/26/2012 3:...	3..	
Gary Woodall - NOAA Fe...	Fwd: [DROUGHT] Draft 1 Partial	Mon 11/26/2012 3:...	1..	

While we are doing much of our drought work using GIS software, our main method of correspondence is through email – the “Listserv”. The email traffic can get overwhelming at times.

Re: Florida Discussion

Eric Oglesby - NOAA Fed...

Sent: Tue 11/27/2012 12:53 PM

To: Zierden, David

Cc: Victor Murphy;
Barry Baxter - NOAA Fed...
; David Zierden;
Richard J Lanier;

All,

I have no problem holding off introducing D0 to west central and southwest Florida. There is definitely short term dryness the past six weeks or so. But since November is one of the driest months of the year climatologically, the overall rainfall deficits are not that great. The percent of normal looks really bad, but this time of year isn't necessarily representative of drought because average monthly rainfall is only 2 to 2.5 inches...which can be made up in one or two events. It all depends what scale you want to look at on the drought

See...

The "hole" of D2 between MCN and ATL likely needs to start being filled in some. Was wondering if the D3 over Macon could be nudged northward to cover Monroe County.

Perhaps some increase in the amount of D3 for Mitchell County is in order? Similarly, can the D3/D2/D1 be pushed southward some in Grady County in southwest GA? Arguably, you can extend the D1 eastward near TLH in north FL to cover northern Leon County which would assist you here. Other than that, consider GA a "wrap" for the week.

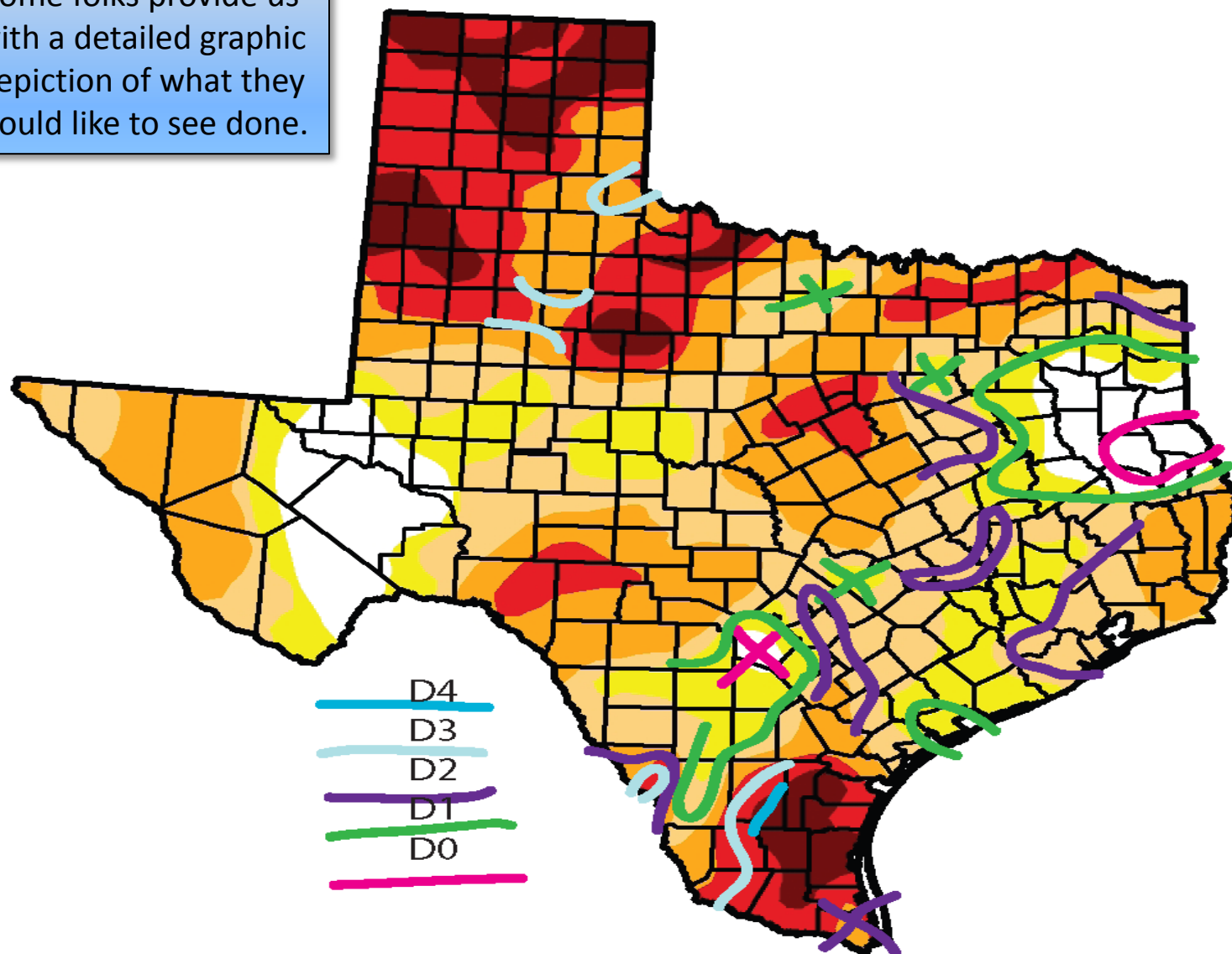
Based on our Texas coordination call this morning, recommendations are below. We're being especially sensitive to short-term drought in the winter wheat areas of the state. We project that October-November will rank somewhere between 2nd and 4th driest on record for Texas.

I'm a little concerned that the eastern sections of the Appomattox Basin in Virginia have slipped out of D1. Precip departures, especially over 90 days, are not horrible, but there is still a deficit. And with streamflows running quite low, groundwater running low, and a drought watch in effect, I think that the D1 should be expanded eastward to include all of Buckingham, all of Campbell, Cumberland, southwest Powhatan, and Amelia Counties.

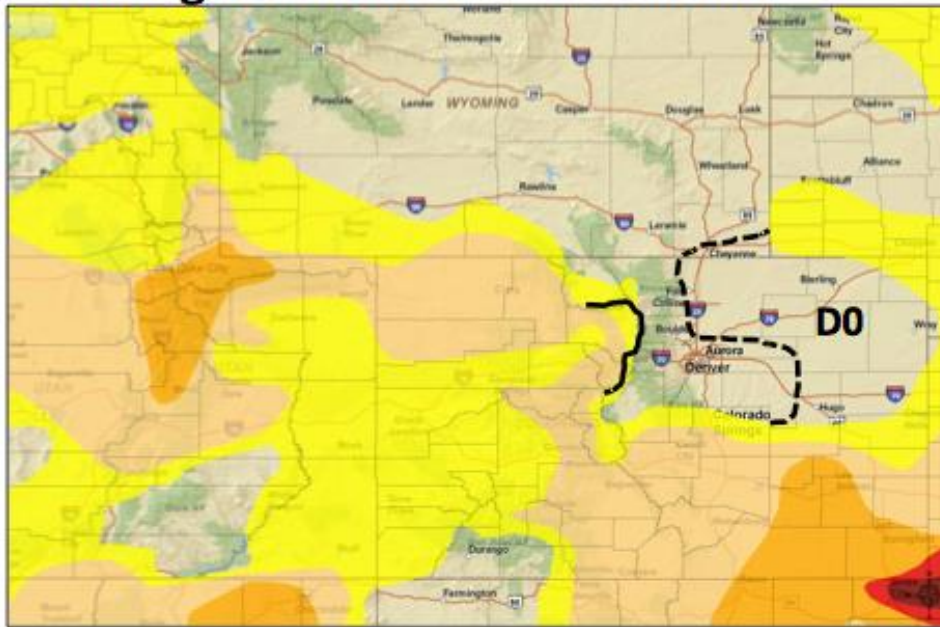
South Florida - Here there are differing opinions on whether or not to introduce D0 to Collier and Monroe counties. While these areas, especially coastal Collier County, have been dry in the short term, the wet season was very good and hydrologic systems are in good shape.

These actual email snippets are a very small sample of the type of detailed information and suggestions we receive. County lists are actually preferred, altho we recv everything from highways to mountain ranges to river basins. In GIS, it's all very doable

Some folks provide us with a detailed graphic depiction of what they would like to see done.



Drought and Water Discussion



Drought – Exceptional	0 to 2 (D4)
Drought – Extreme	2 to 5 (D3)
Drought – Severe	5 to 10 (D2)
Drought – Moderate	10 to 20 (D1)
Abnormally Dry	20 to 30 (D0)

Drought categories and their associated percentiles

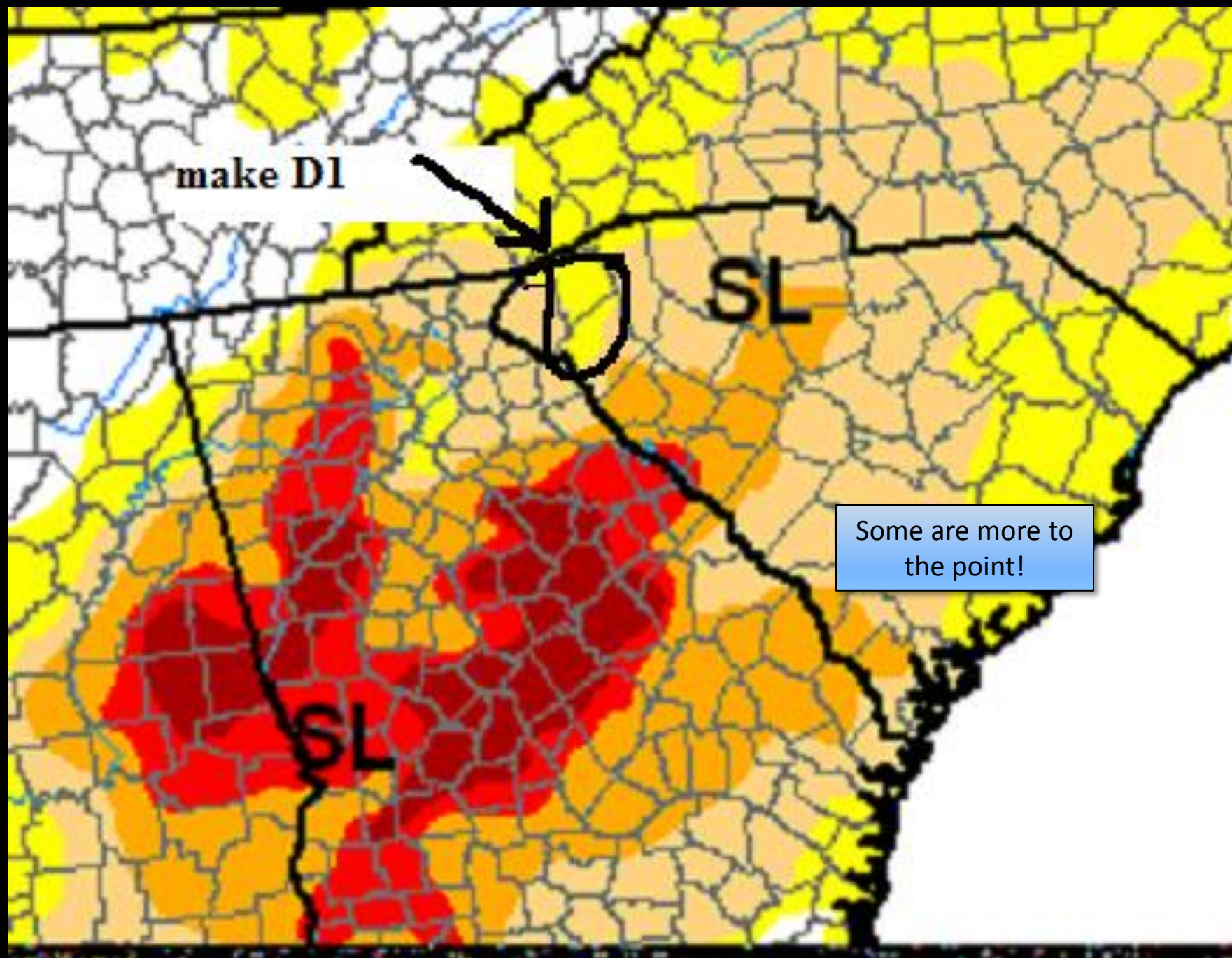
The Colorado group sends out a full presentation to back up their suggestions after their Conf Call.

Fig. 9: March 13th release of U.S. Drought Monitor for the UCRB.

On the current depiction of the U.S. Drought Monitor (USDM) map (Fig. 9), the USDM author has decreased the area of D2 in the Wasatch range in the UCRB based on recent precipitation. In the northern CO mountains (Grand County), it is recommended that the D1 be adjusted slightly and expanded eastward along the Continental Divide (Fig. 9, solid black line). This will set up a very sharp gradient at and west of the Divide, which is representative of conditions in that area and will match better with SNOTEL precipitation percentiles.

In northeast CO, a further expansion of D0 is recommended (Fig. 9, dashed black line). In the past 30 days, this area has experienced little to no precipitation, much warmer than average temperatures, low relative humidities, high winds, and wildfire dangers. 30-day SPIs are very low, VIC soil moisture shows drying, and D0 will better represent that short-term dryness being experienced there.

Status quo is recommended for the rest of CO and the rest of the UCRB.



U.S. Drought Monitor






November 27, 2012

Valid 7 a.m. EST


Ultimately, authors make the final call, as our name is on the map; we often get questions/press interviews once the map is released.

Need to be able to support our depiction with data or impacts.

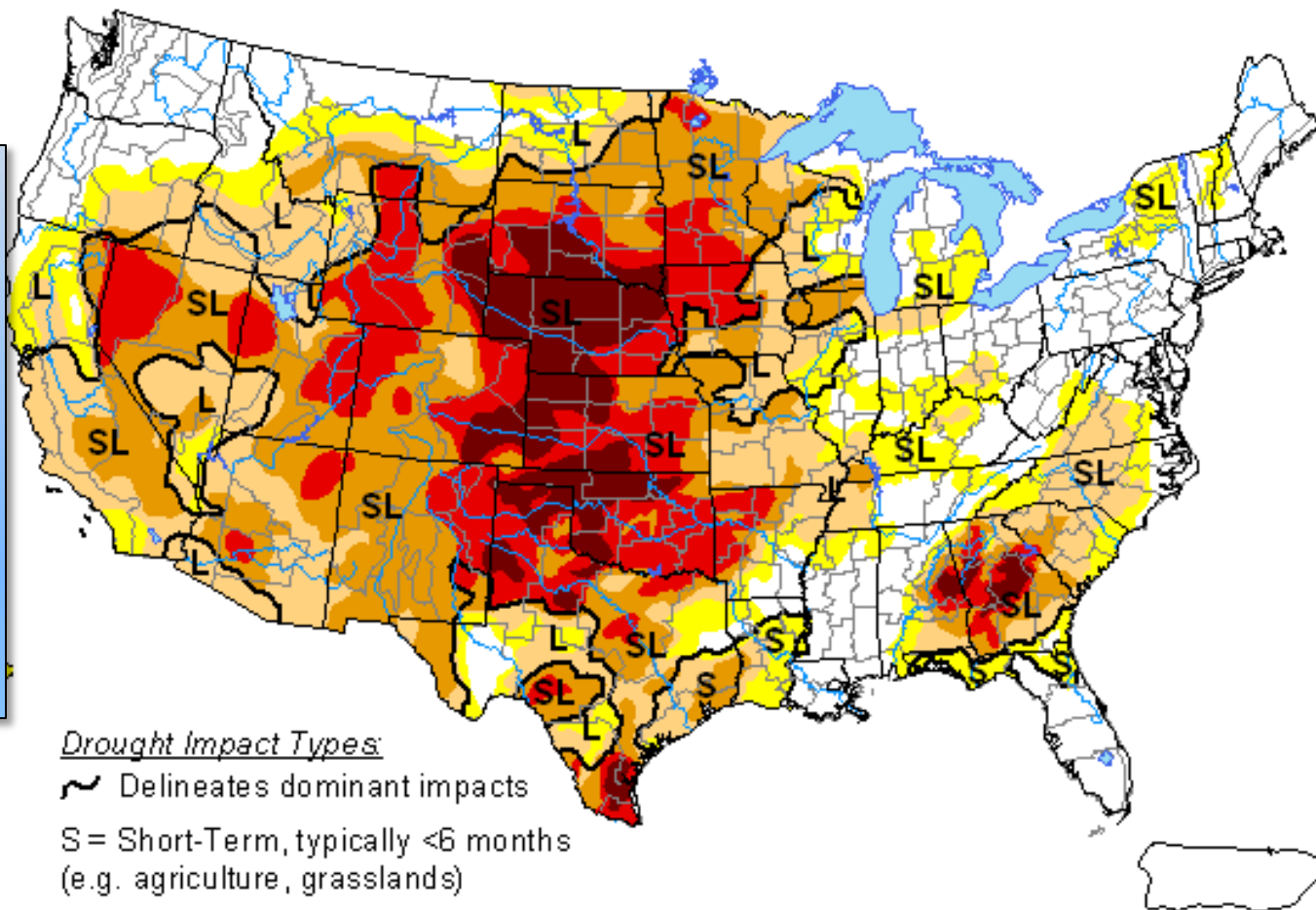
Intensity:

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

Drought Impact Types:

-  Delineates dominant impacts
- S = Short-Term, typically <6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months (e.g. hydrology, ecology)

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



Released Thursday, November 29, 2012

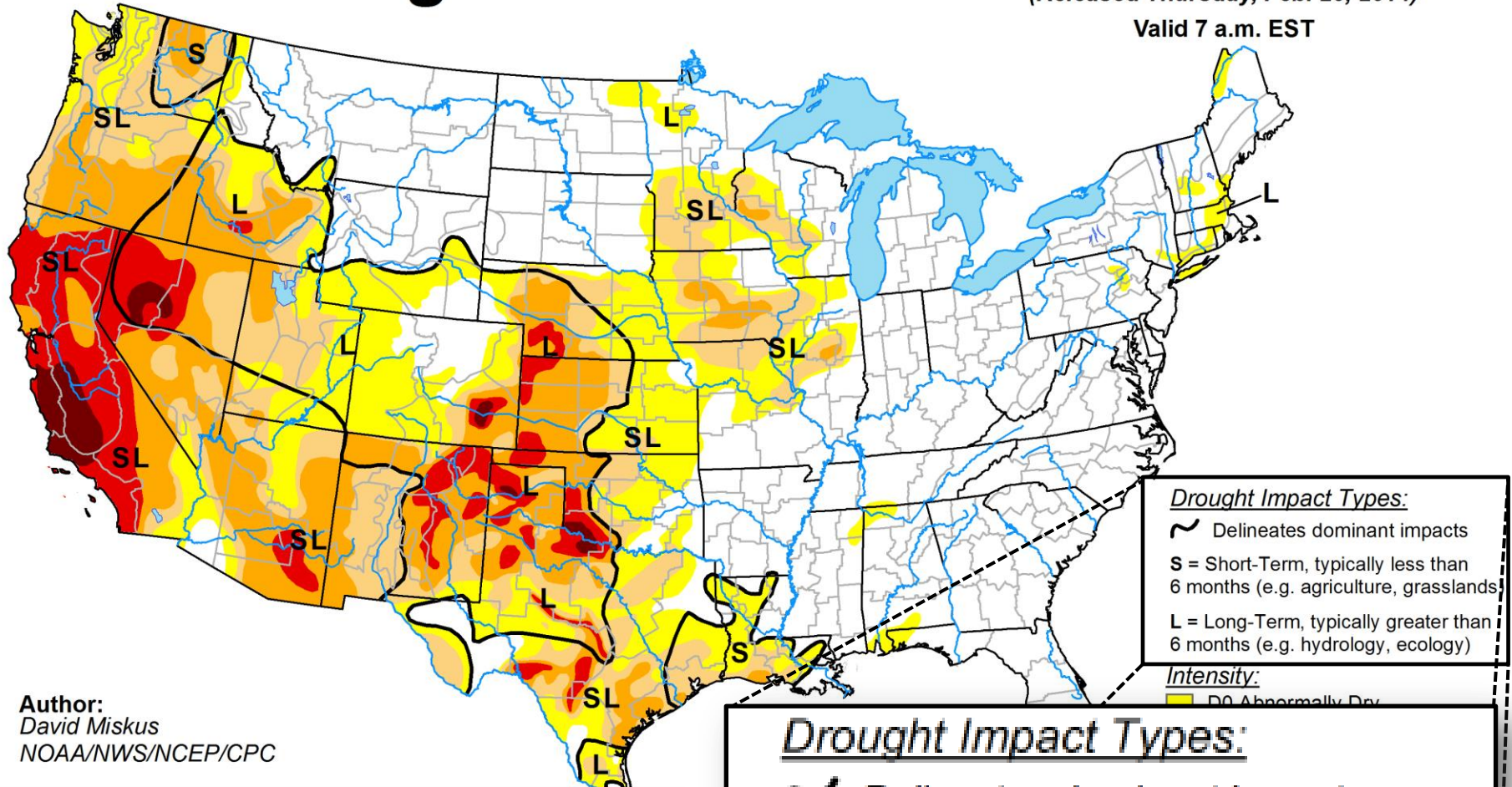
Author: Eric Luebehusen, U.S. Department of Agriculture

<http://droughtmonitor.unl.edu/>

Tools, Data, & Methodology

U.S. Drought Monitor

February 18, 2014
(Released Thursday, Feb. 20, 2014)
Valid 7 a.m. EST

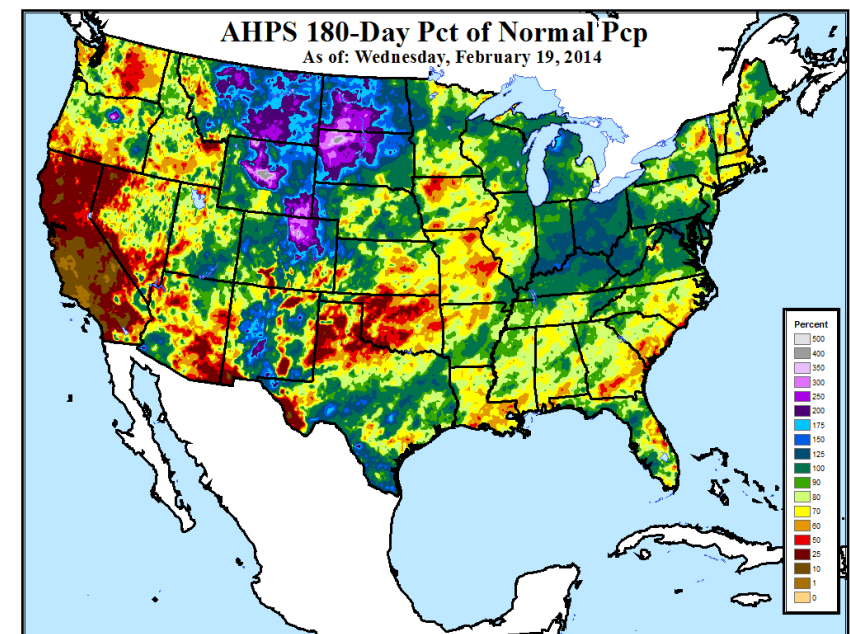
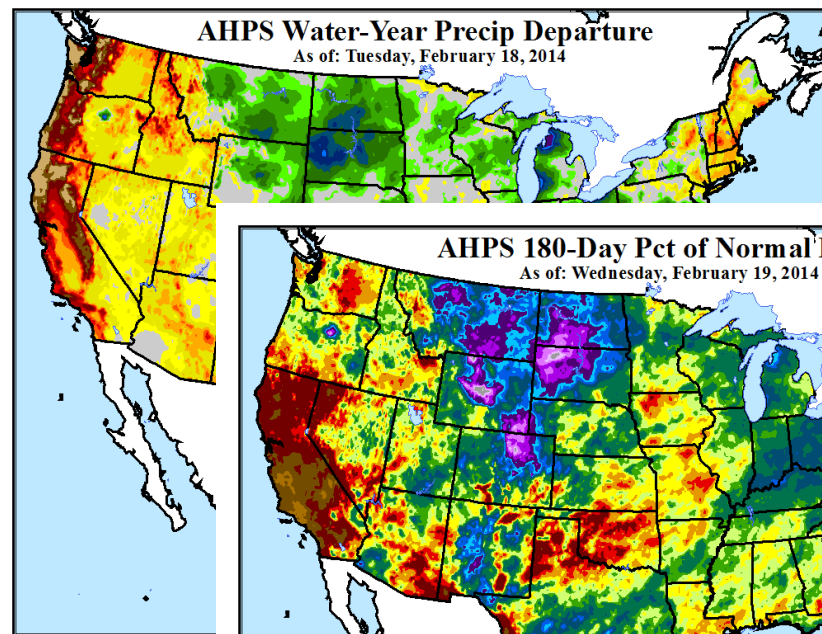
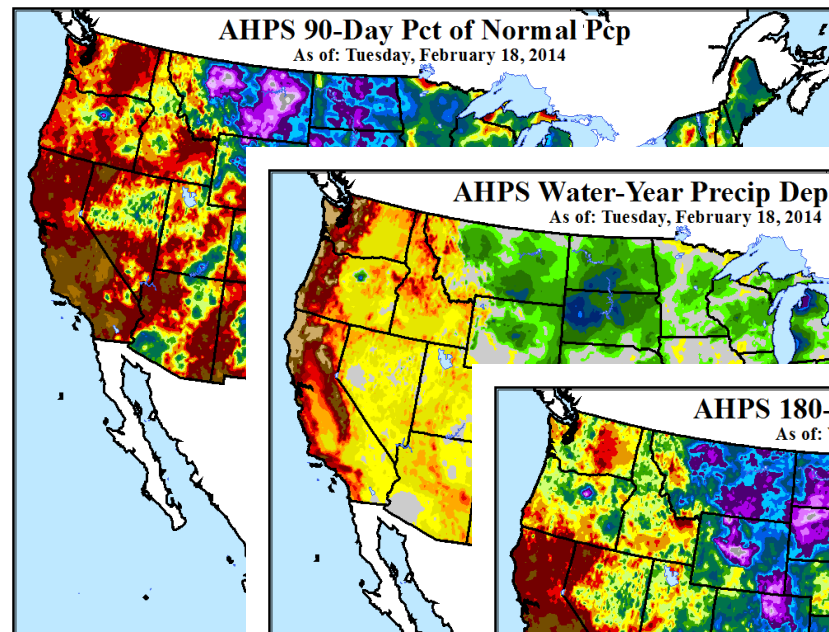
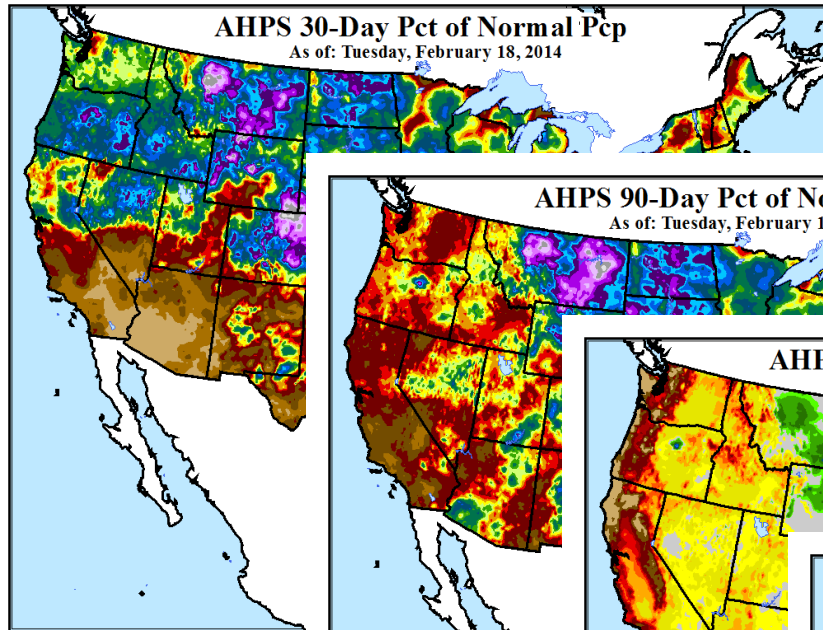
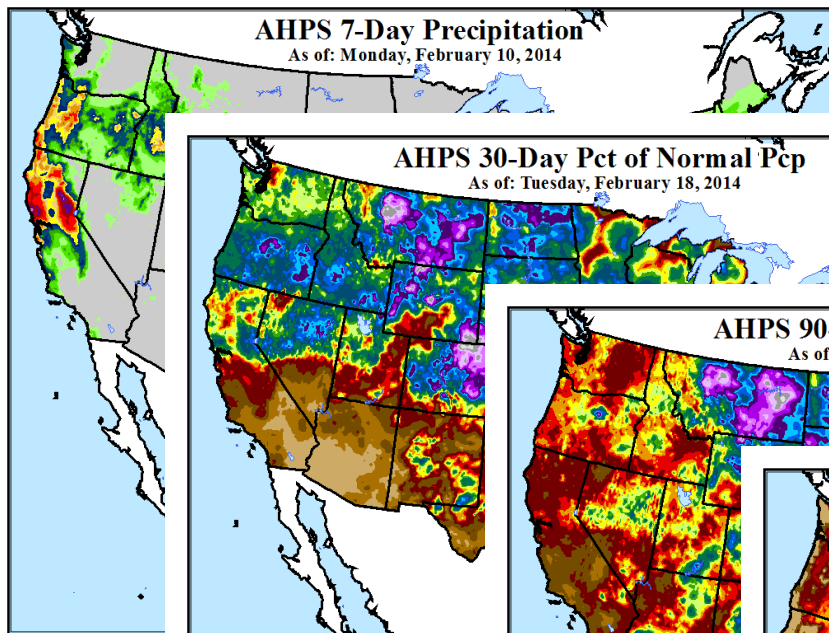


Author:
David Miskus
NOAA/NWS/NCEP/CPC

The USDM tries to capture both Short-Term (6 months or less) and Long-Term Drought on a single map, concentrating on IMPACTS. This is the most daunting task facing the authors. To assist, we have a myriad of products and data at our disposal....

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)

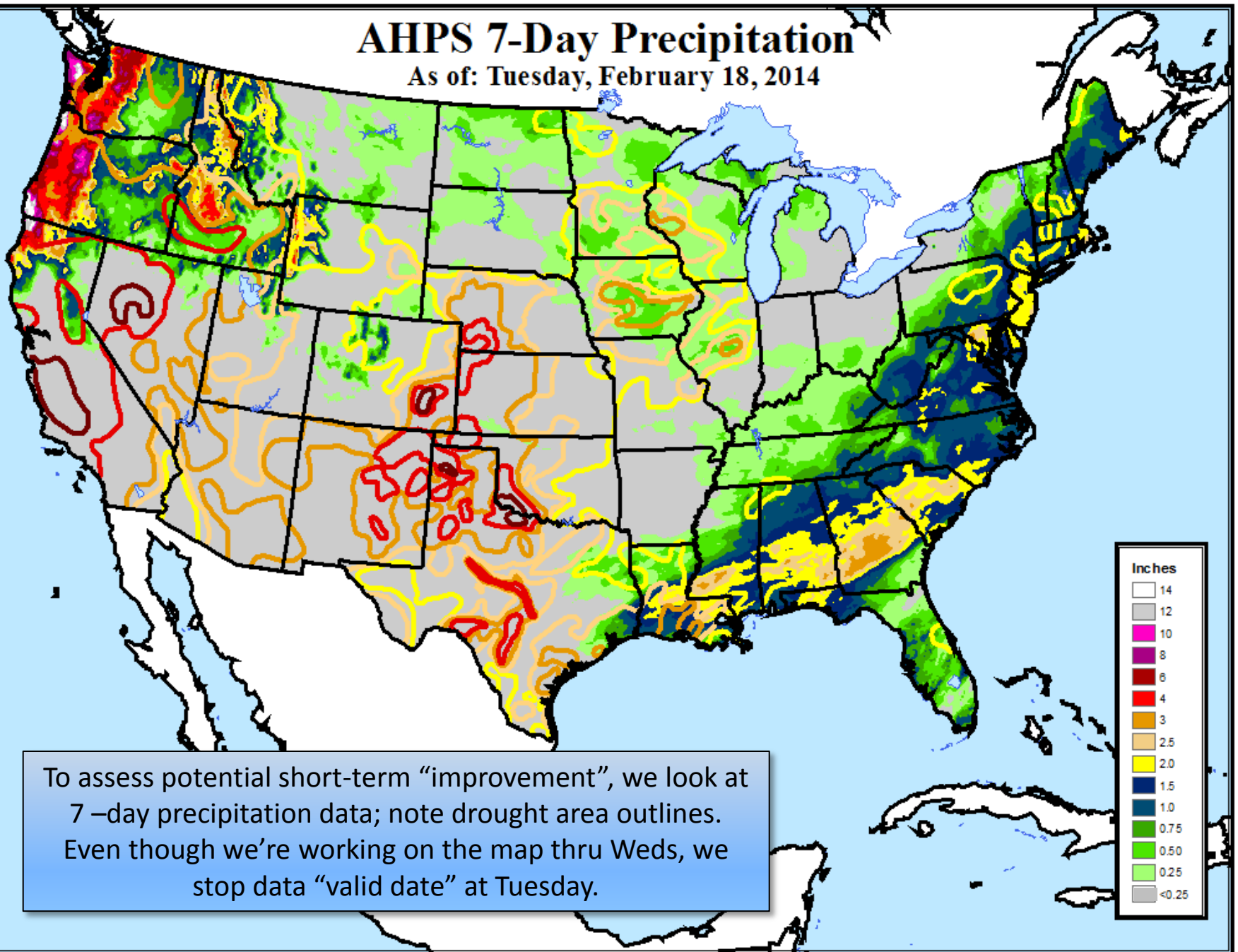


Authors use a gridded precipitation dataset called “AHPS” – *Advanced Hydrological Prediction Service* – which supplies total precipitation, precipitation departure, and percent of normal at numerous timescales.

Data - <http://water.weather.gov/precip/>

AHPS 7-Day Precipitation

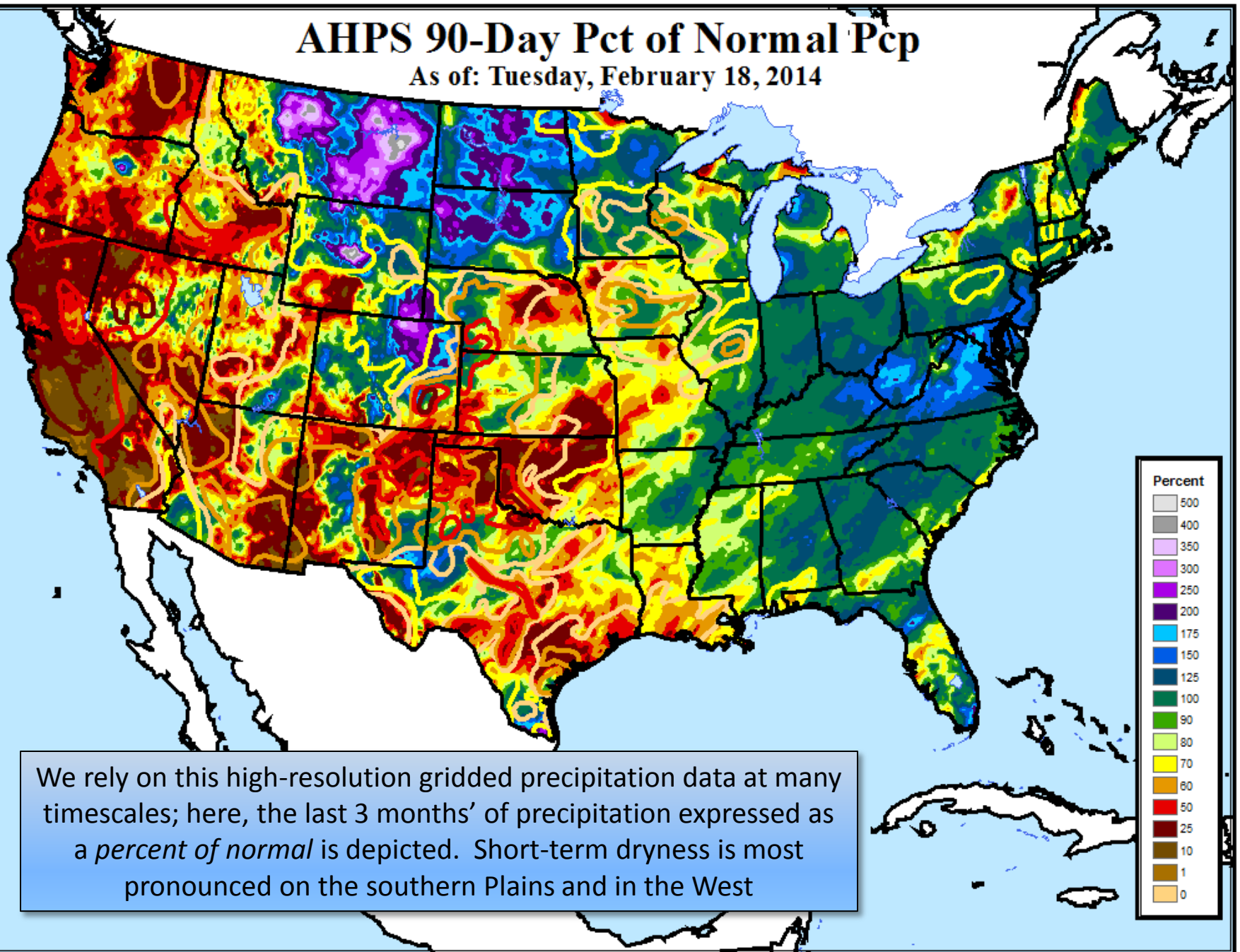
As of: Tuesday, February 18, 2014



To assess potential short-term “improvement”, we look at 7 –day precipitation data; note drought area outlines. Even though we’re working on the map thru Weds, we stop data “valid date” at Tuesday.

AHPS 90-Day Pct of Normal Pcp

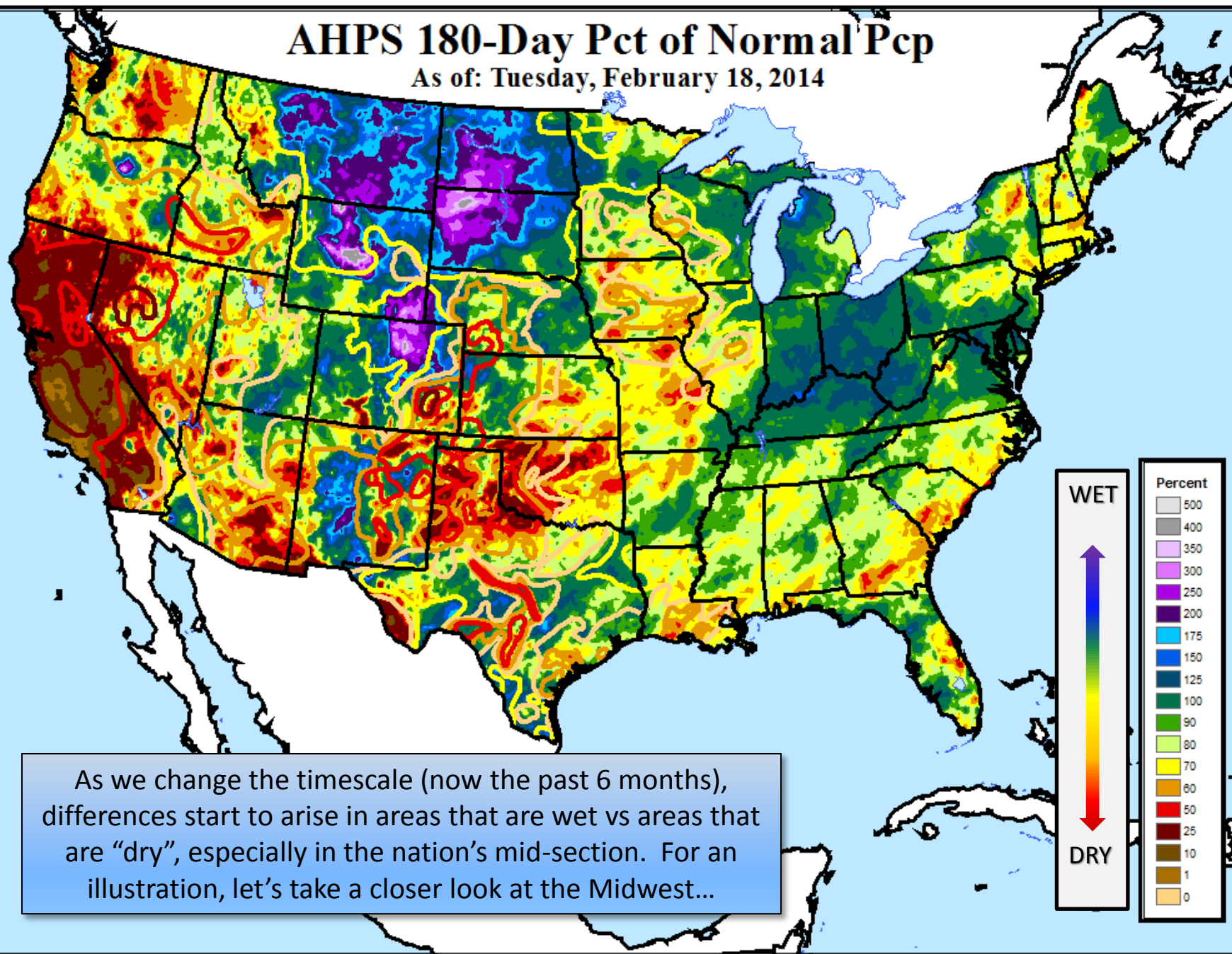
As of: Tuesday, February 18, 2014

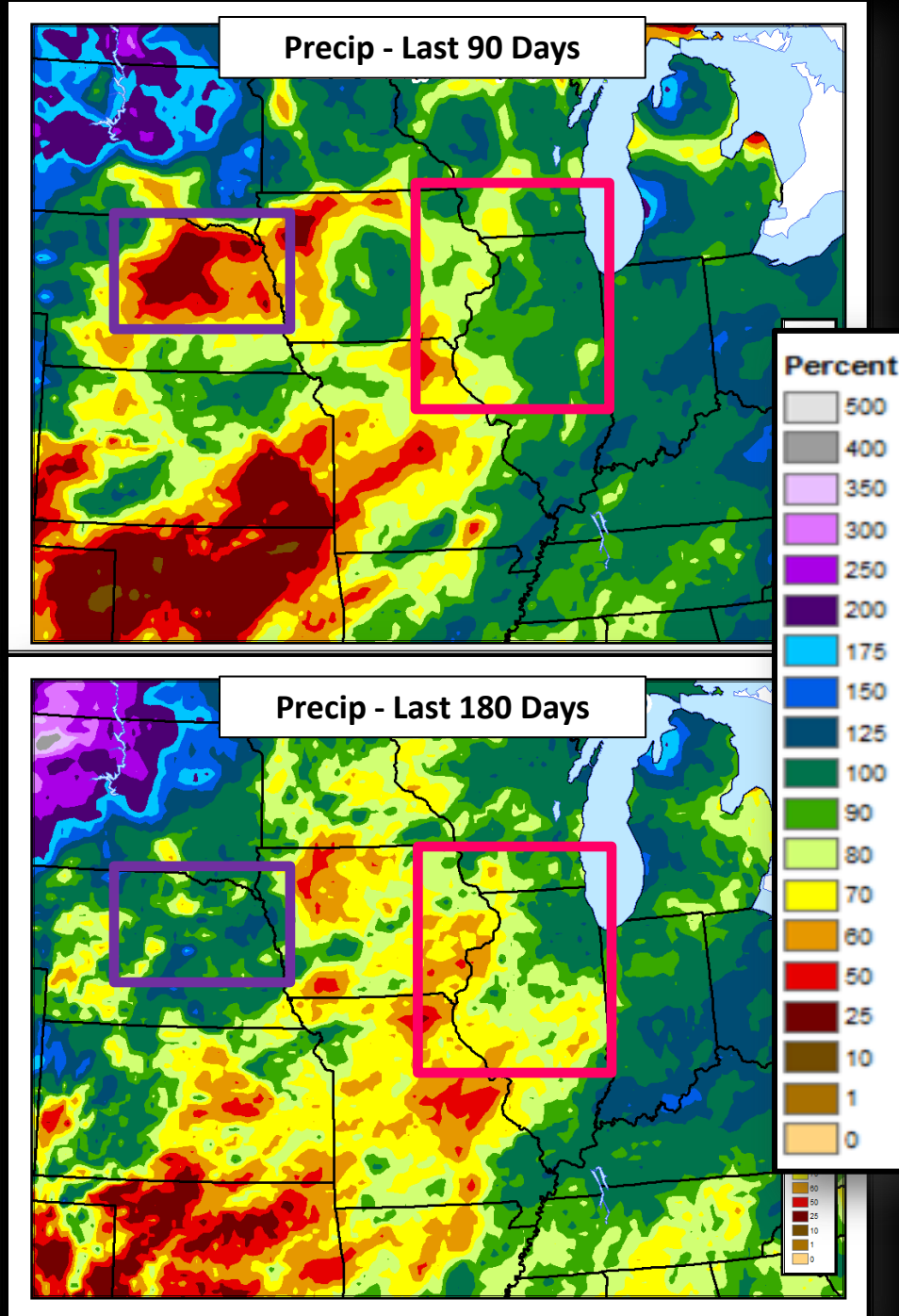


We rely on this high-resolution gridded precipitation data at many timescales; here, the last 3 months' of precipitation expressed as a *percent of normal* is depicted. Short-term dryness is most pronounced on the southern Plains and in the West

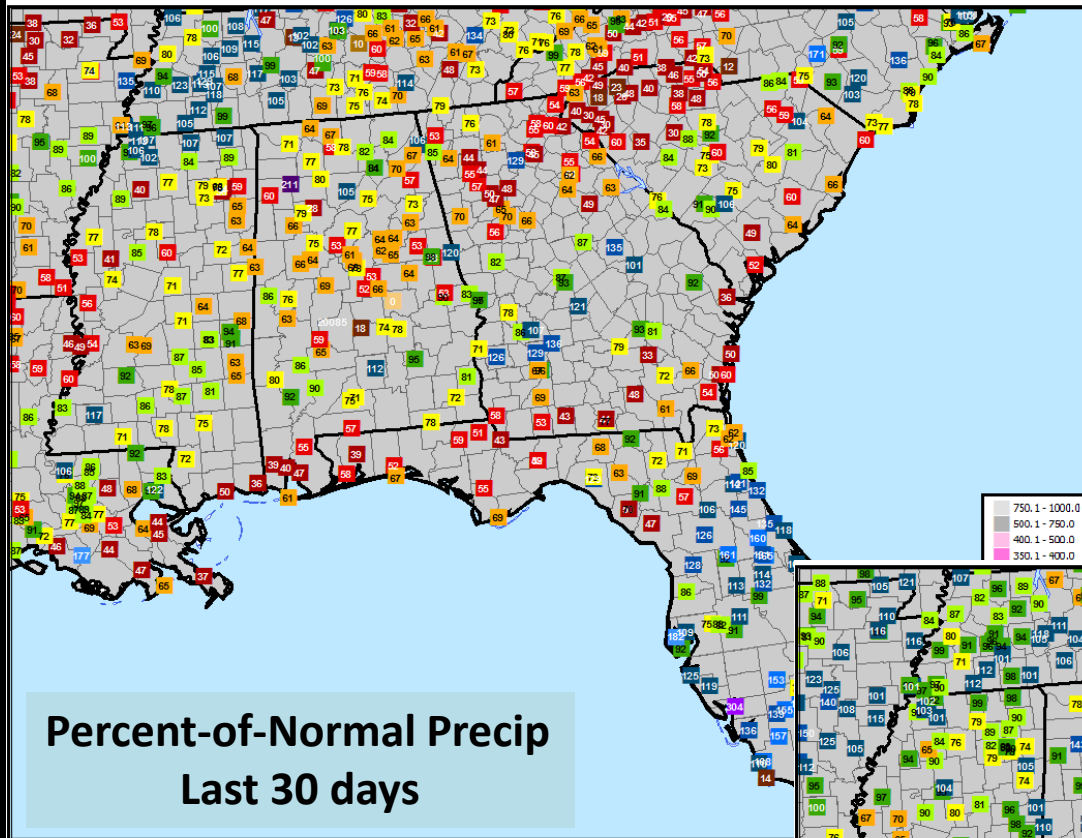
AHPS 180-Day Pct of Normal Pcp

As of: Tuesday, February 18, 2014

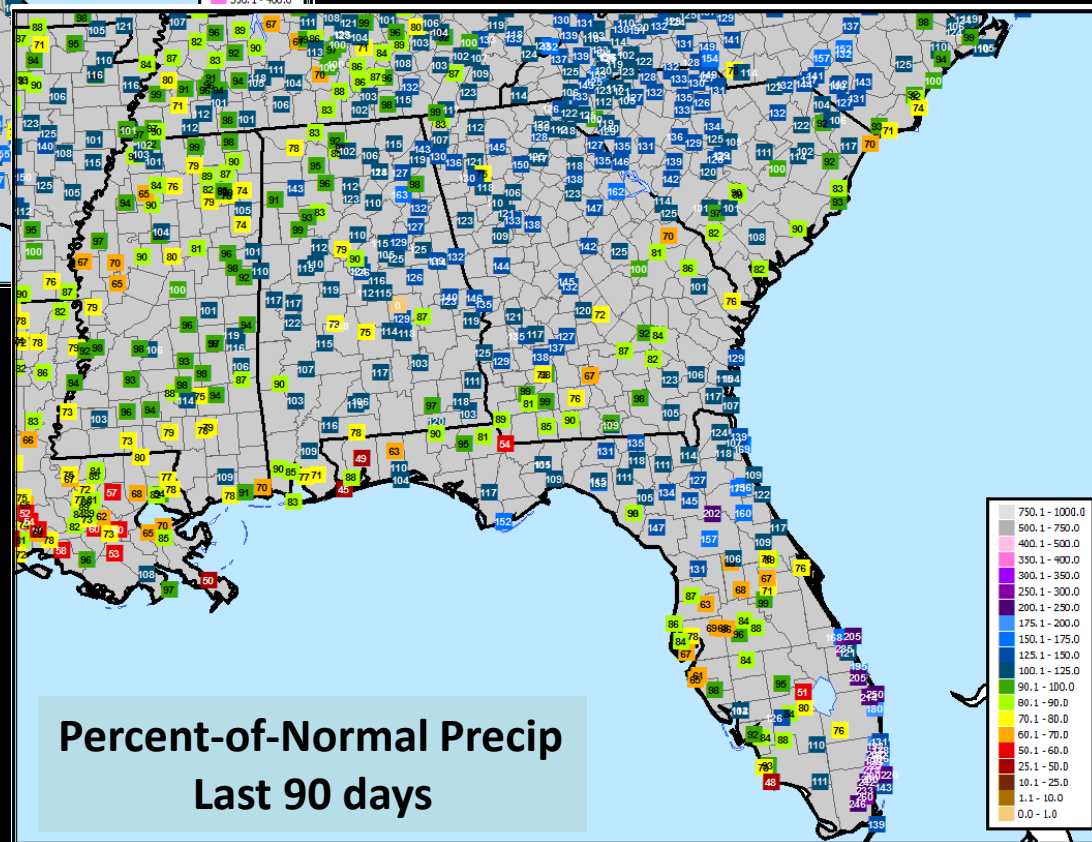




In the **central Corn Belt**, mostly a “Long-Term” (L) component to the drought exists, while in the **western Corn Belt**, mostly a “Short-Term” (S) component to the drought exists.

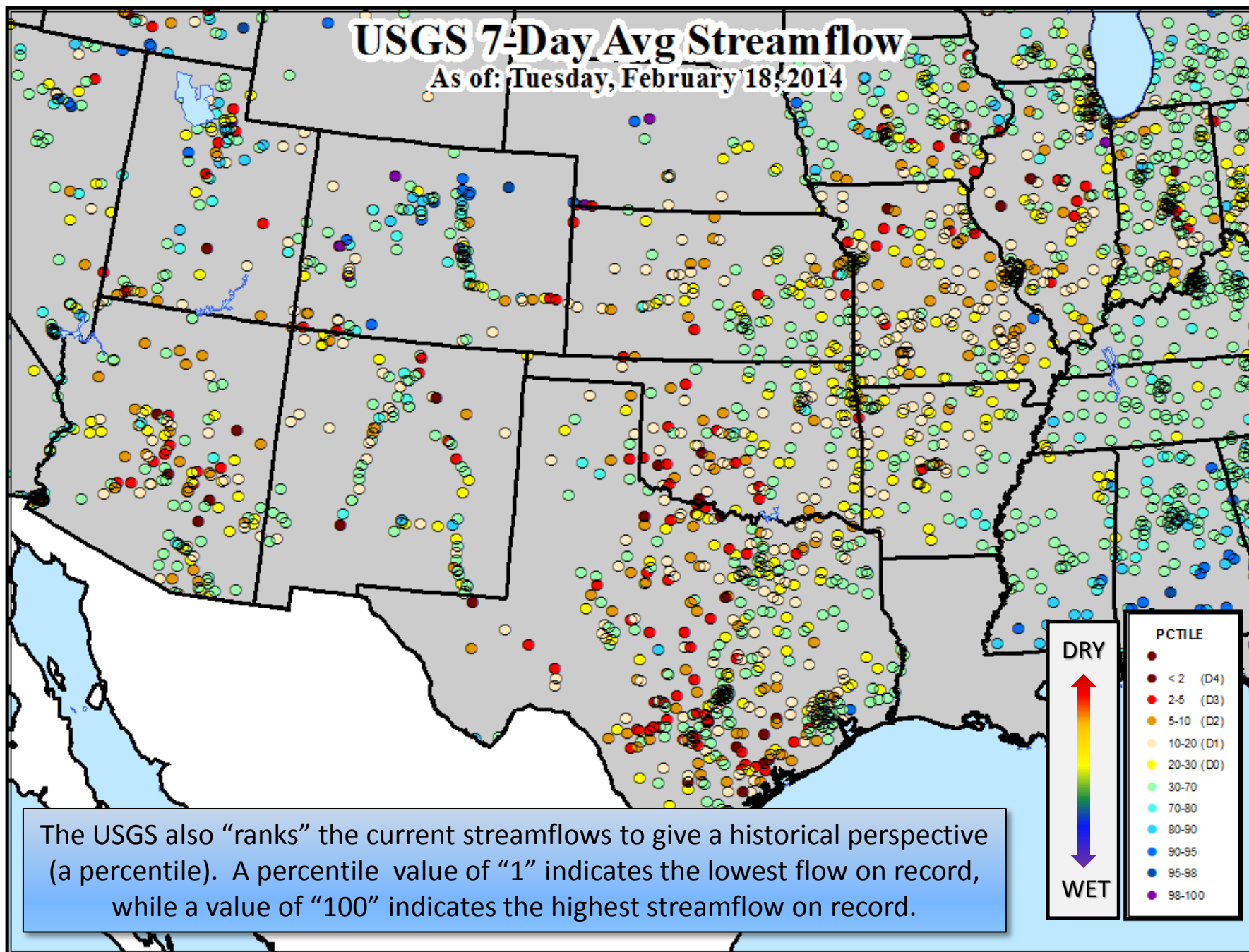


We cross-check the gridded data (which uses radar) with station data. Station data are often superior in areas where terrain interferes with radar beams, or where/when snow is the dominant precip type.



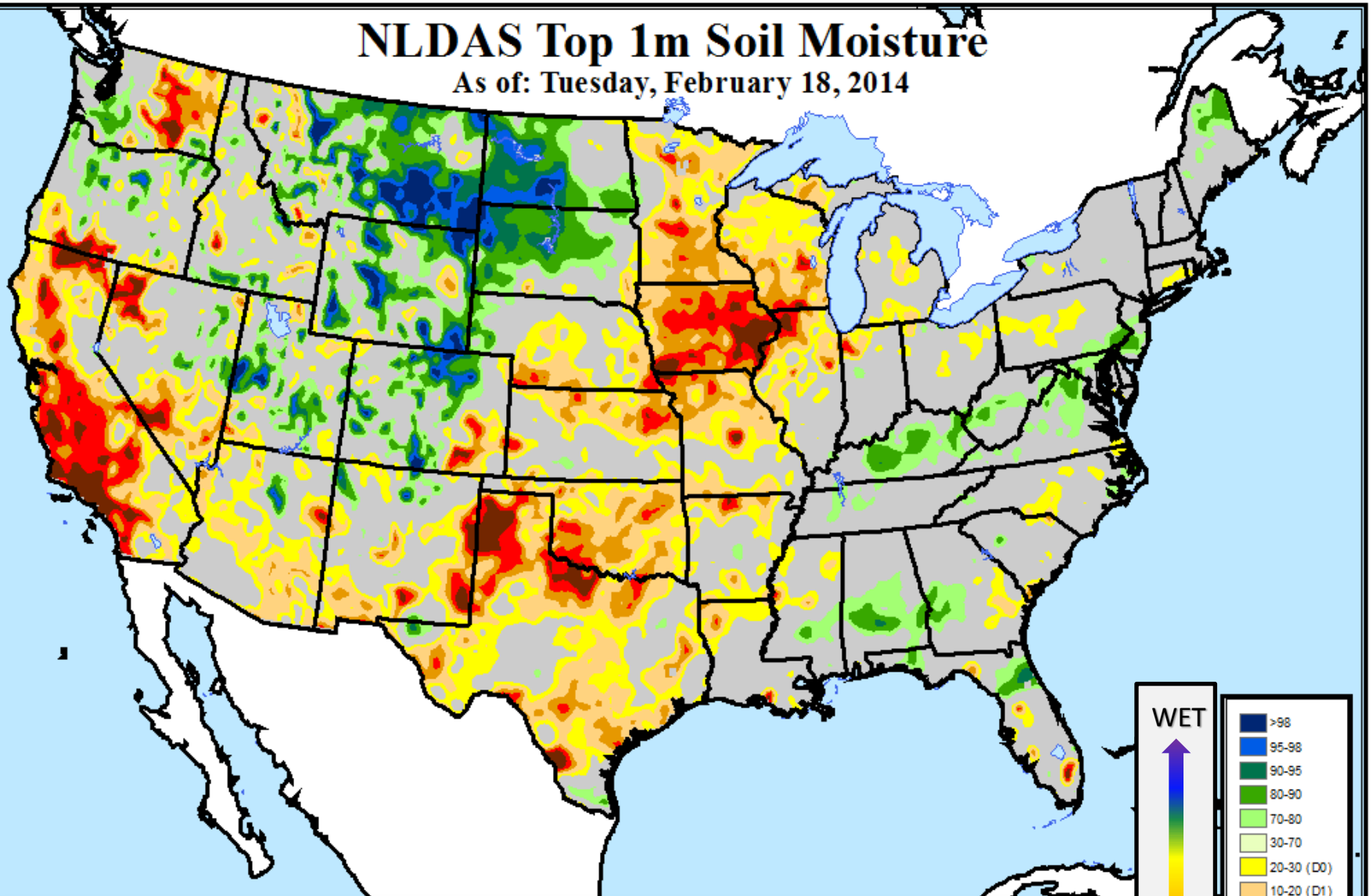
USGS 7-Day Avg Streamflow

As of: Tuesday, February 18, 2014

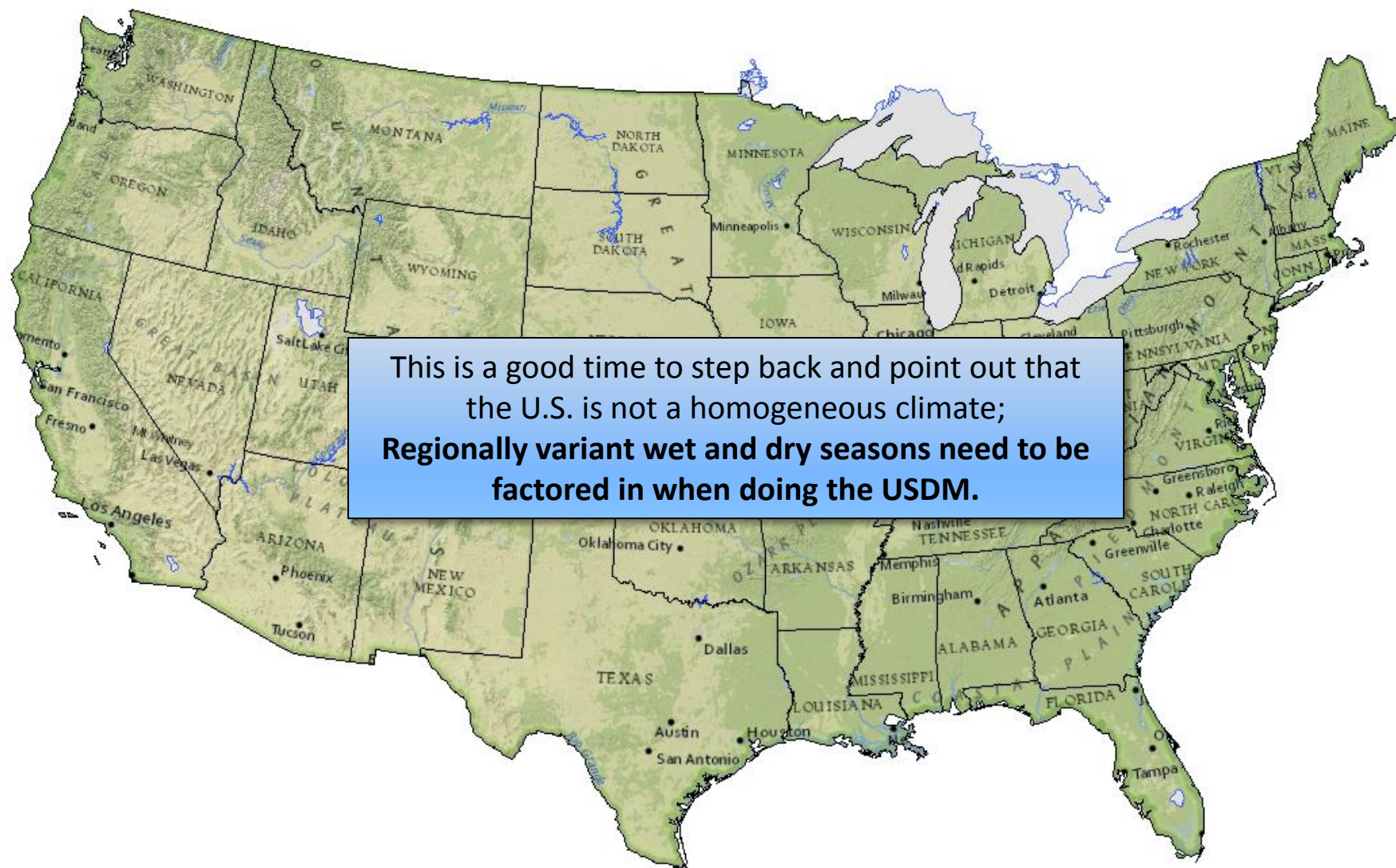


NLDAS Top 1m Soil Moisture

As of: Tuesday, February 18, 2014



While we don't have a soil moisture sensor network, we do have modeled soil moisture to aid the authors. This model (NLDAS) is supplied by the National Weather Service in GIS format.



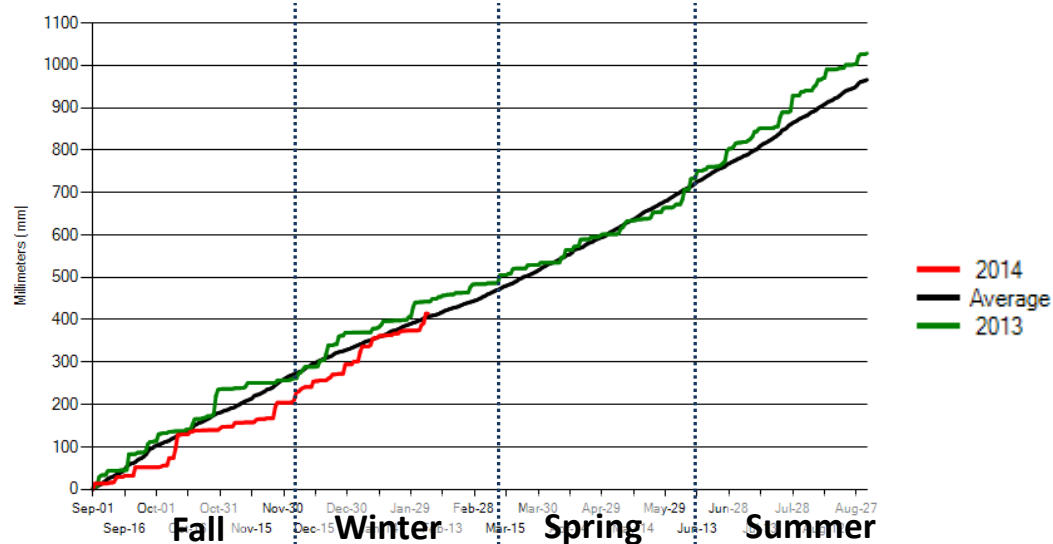
This is a good time to step back and point out that the U.S. is not a homogeneous climate; **Regionally variant wet and dry seasons need to be factored in when doing the USDM.**



Agricultural Weather Assessments
World Agricultural Outlook Board

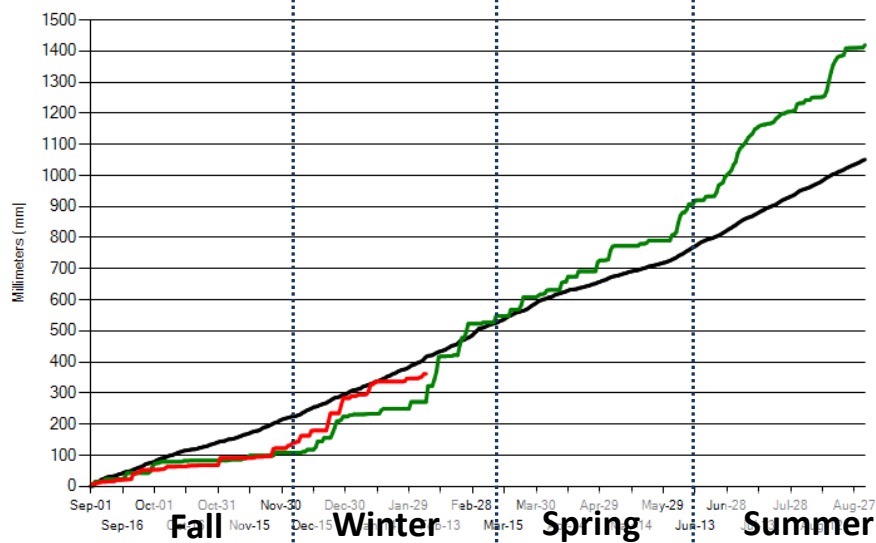
The Mid-Atlantic is one of the few areas in the country that has a consistent year-long wet signal, which makes it difficult for the region to stay in drought for a prolonged period.

**Northern Mid-Atlantic
Cumulative Precipitation (mm)**



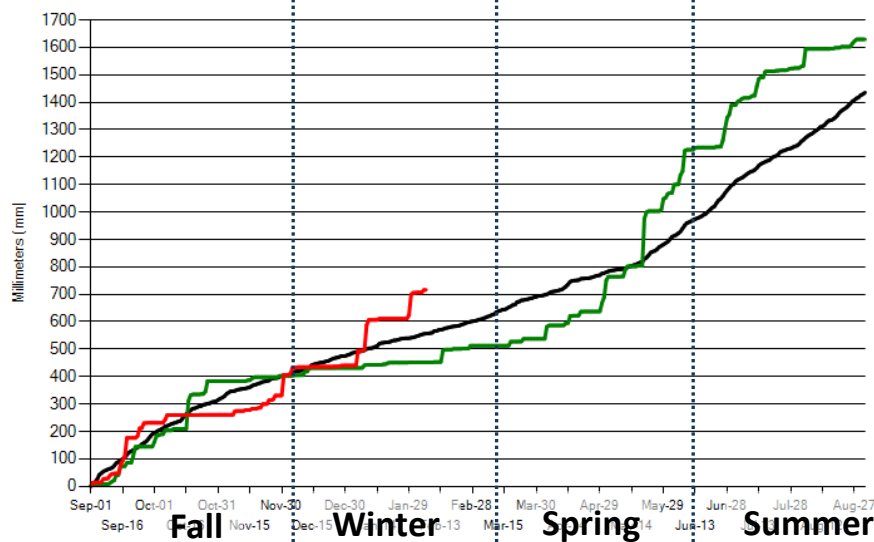
This signal extends down the East Coast into southern Georgia, at which point a sharp transition occurs...

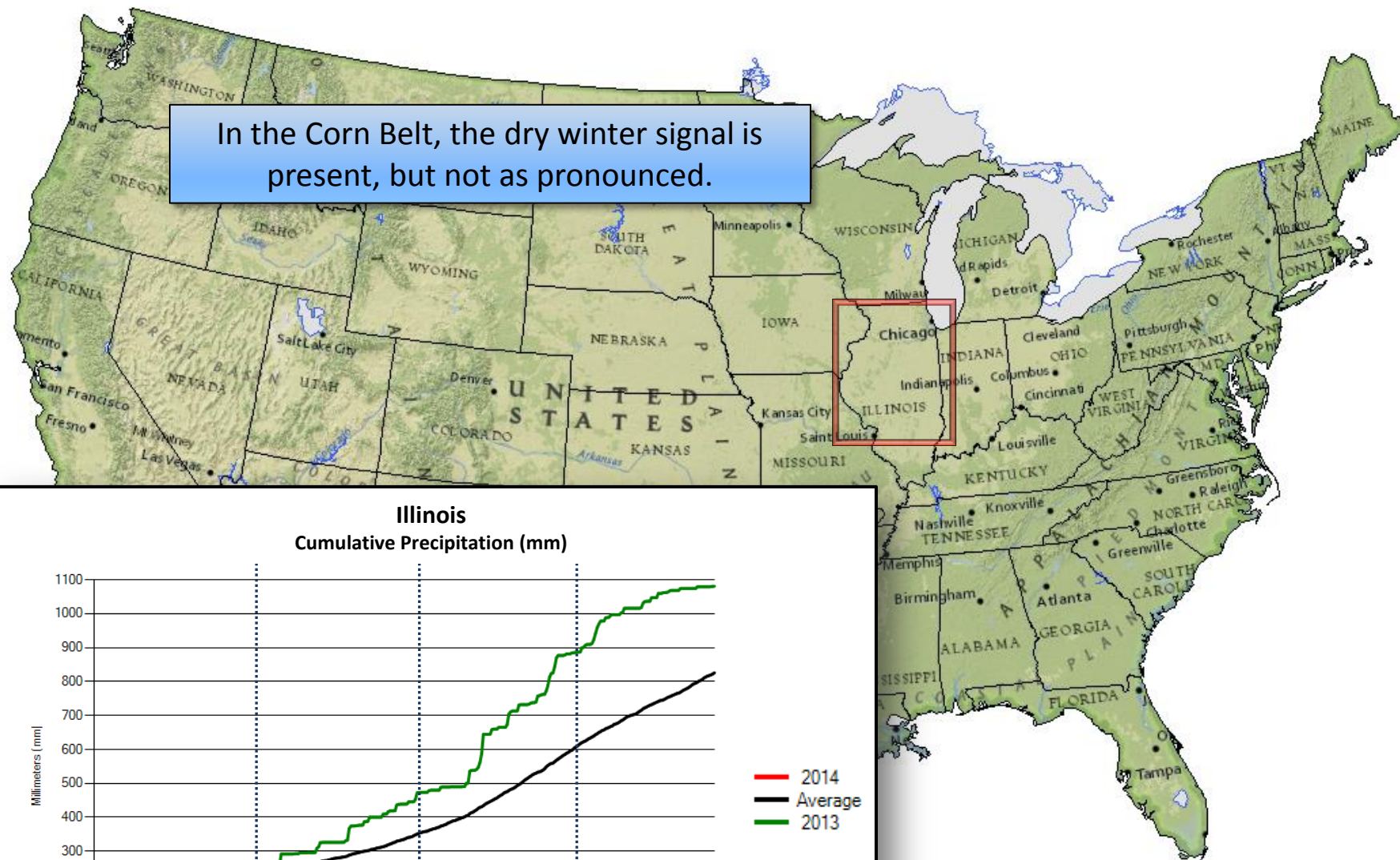
Southern Georgia
Cumulative Precipitation (mm)



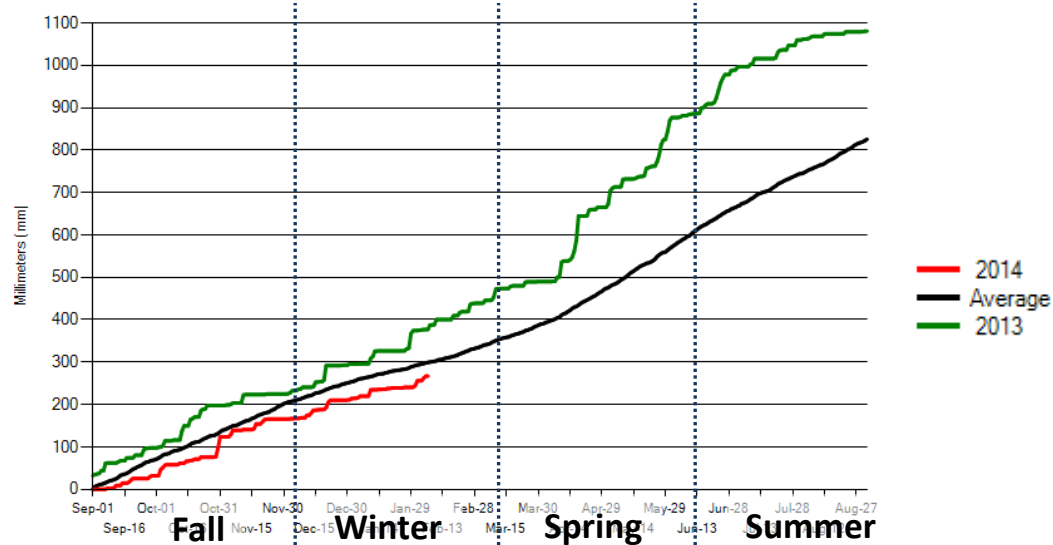
Southern Florida sees a summer-time tropical climate, while dry winters and springs do not carry the same weight in the USDM since that is their “dry season”.

Southern Florida
Cumulative Precipitation (mm)

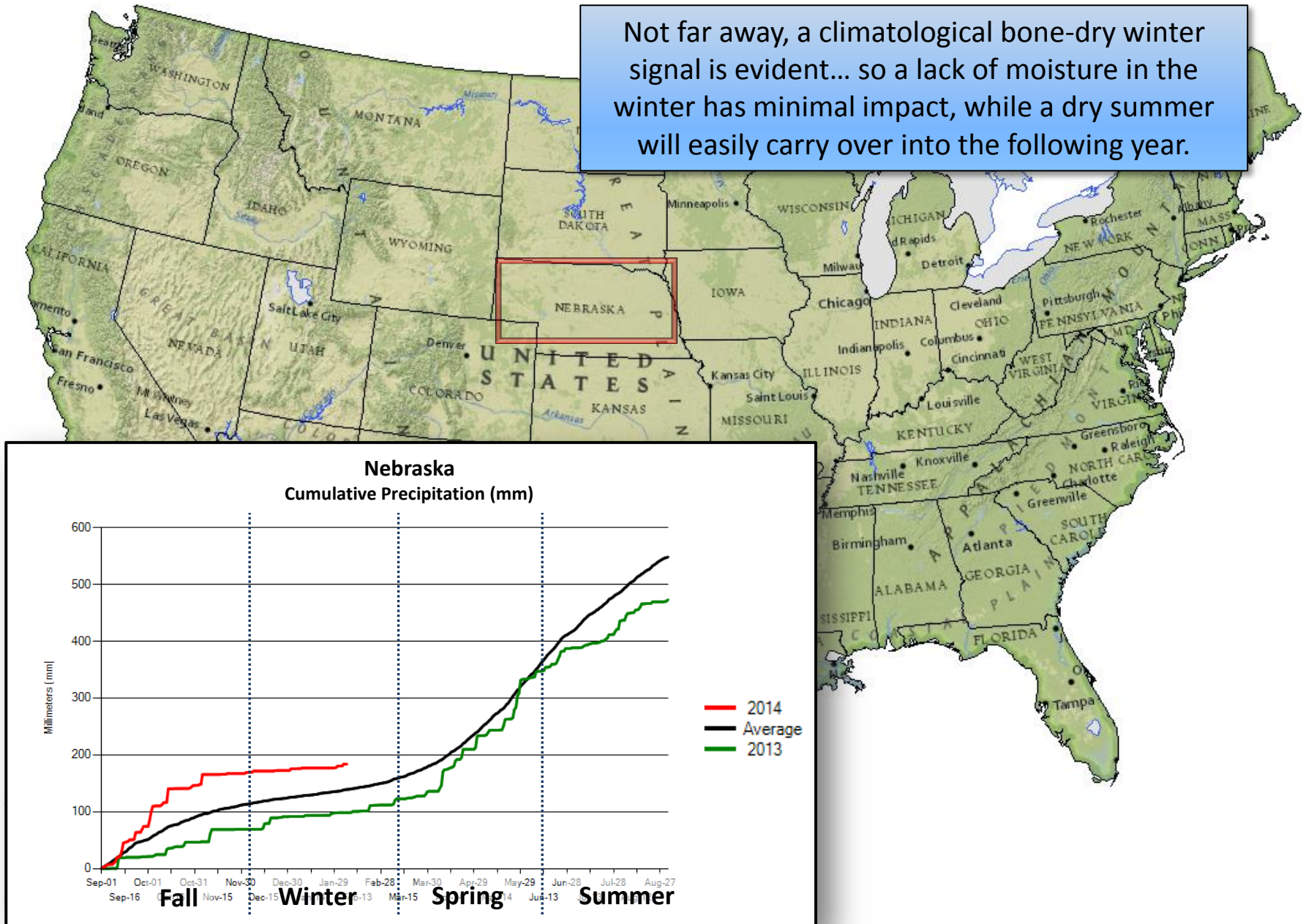




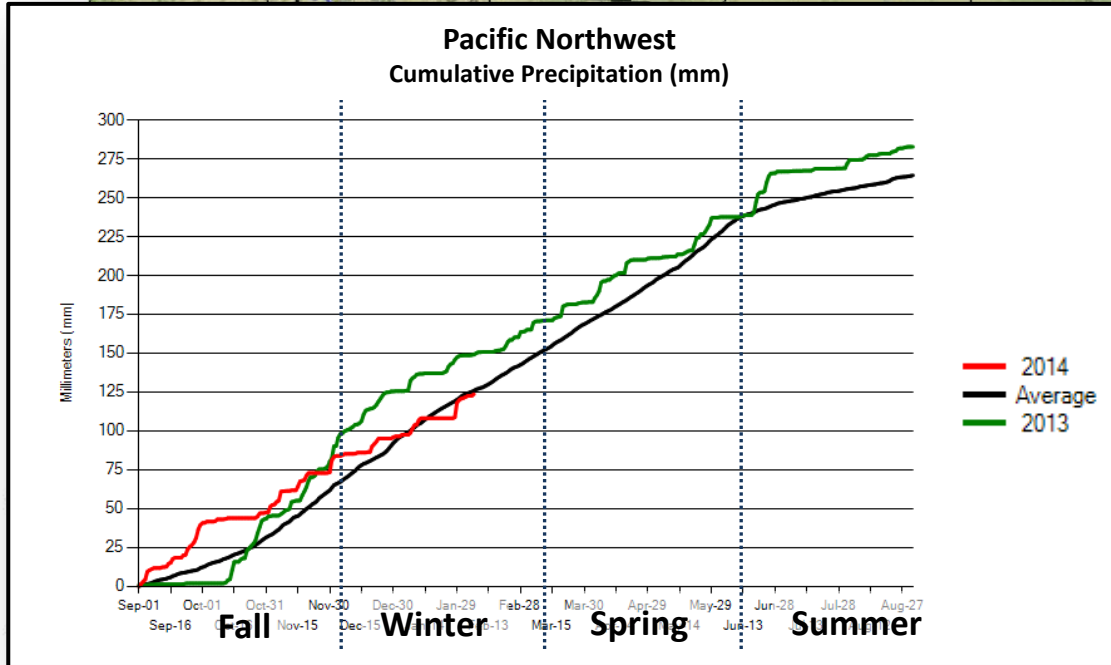
Illinois
Cumulative Precipitation (mm)



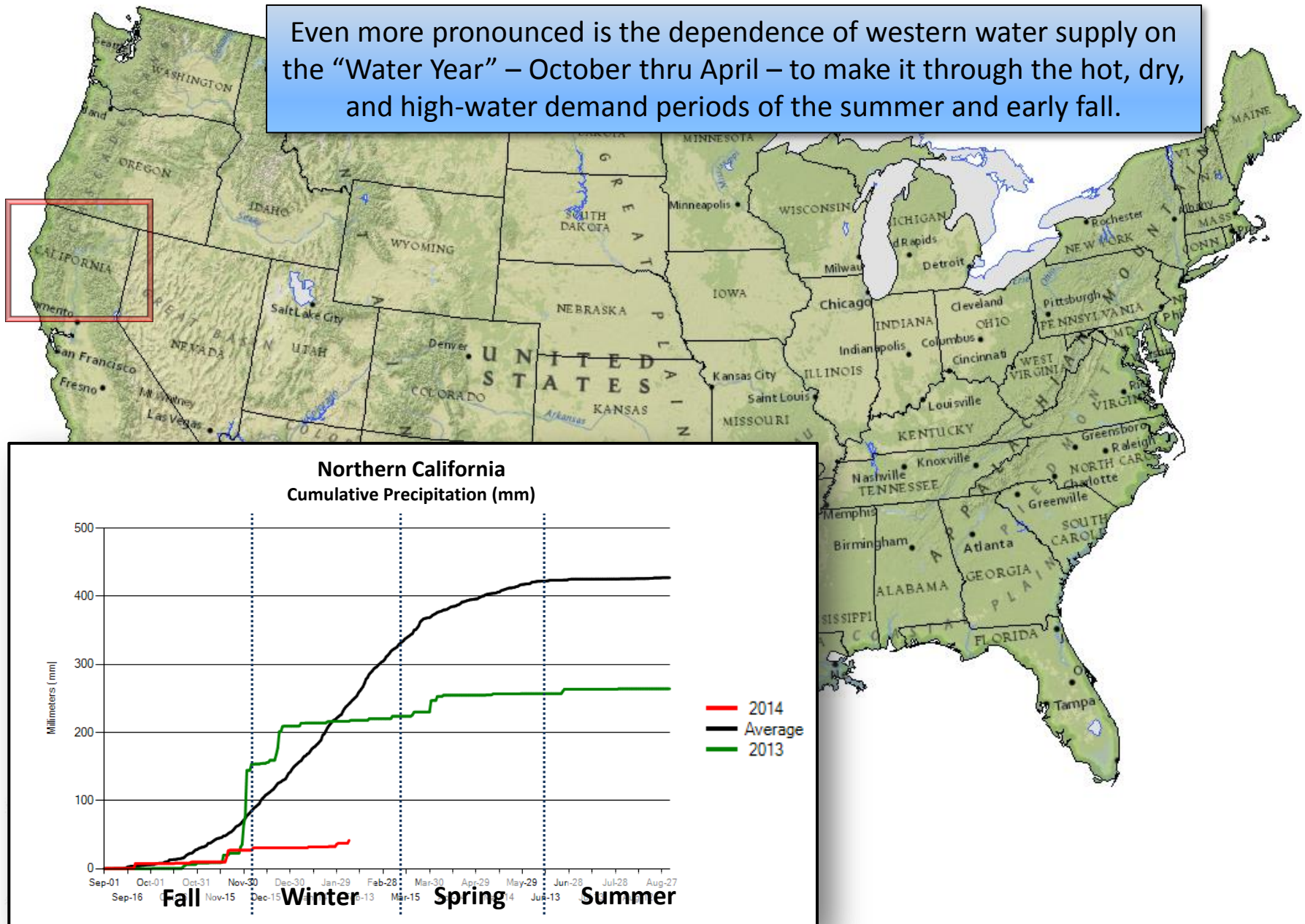
Not far away, a climatological bone-dry winter signal is evident... so a lack of moisture in the winter has minimal impact, while a dry summer will easily carry over into the following year.



Conversely, the valleys of the Pacific Northwest rely heavily on winter-spring rain and snow.



Even more pronounced is the dependence of western water supply on the “Water Year” – October thru April – to make it through the hot, dry, and high-water demand periods of the summer and early fall.



AHPS Water-Year Pct of Normal Pcp

As of: Tuesday, February 18, 2014

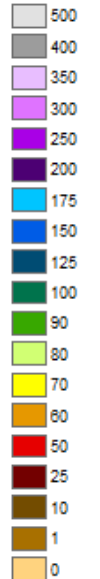
The western Water Year (October-April), especially the latter half, is the period where most drought assessment and change occur from the Rockies to the Pacific Coast.

WET



DRY

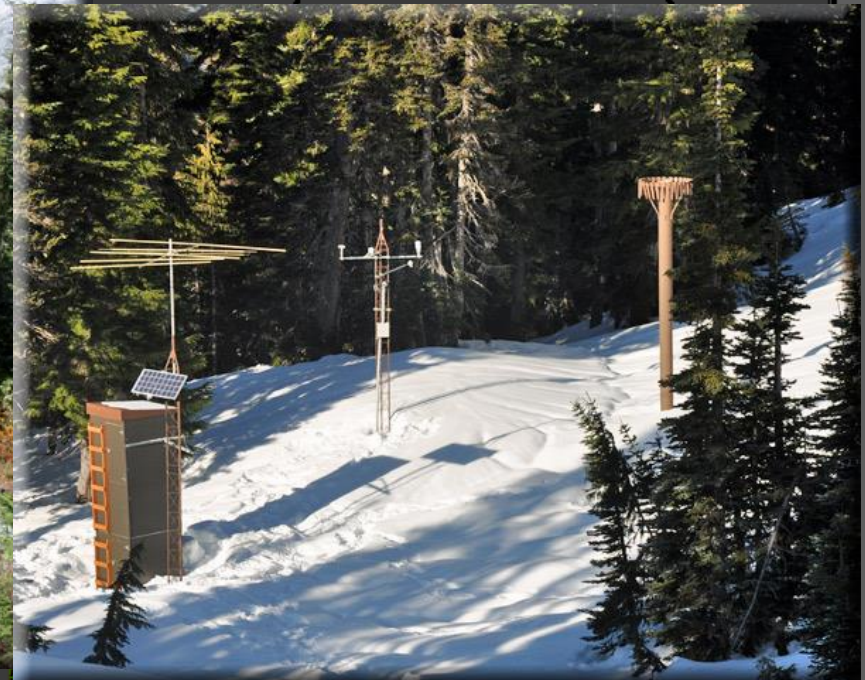
Percent



L - SWE Percentiles

Thursday, March 21, 2013

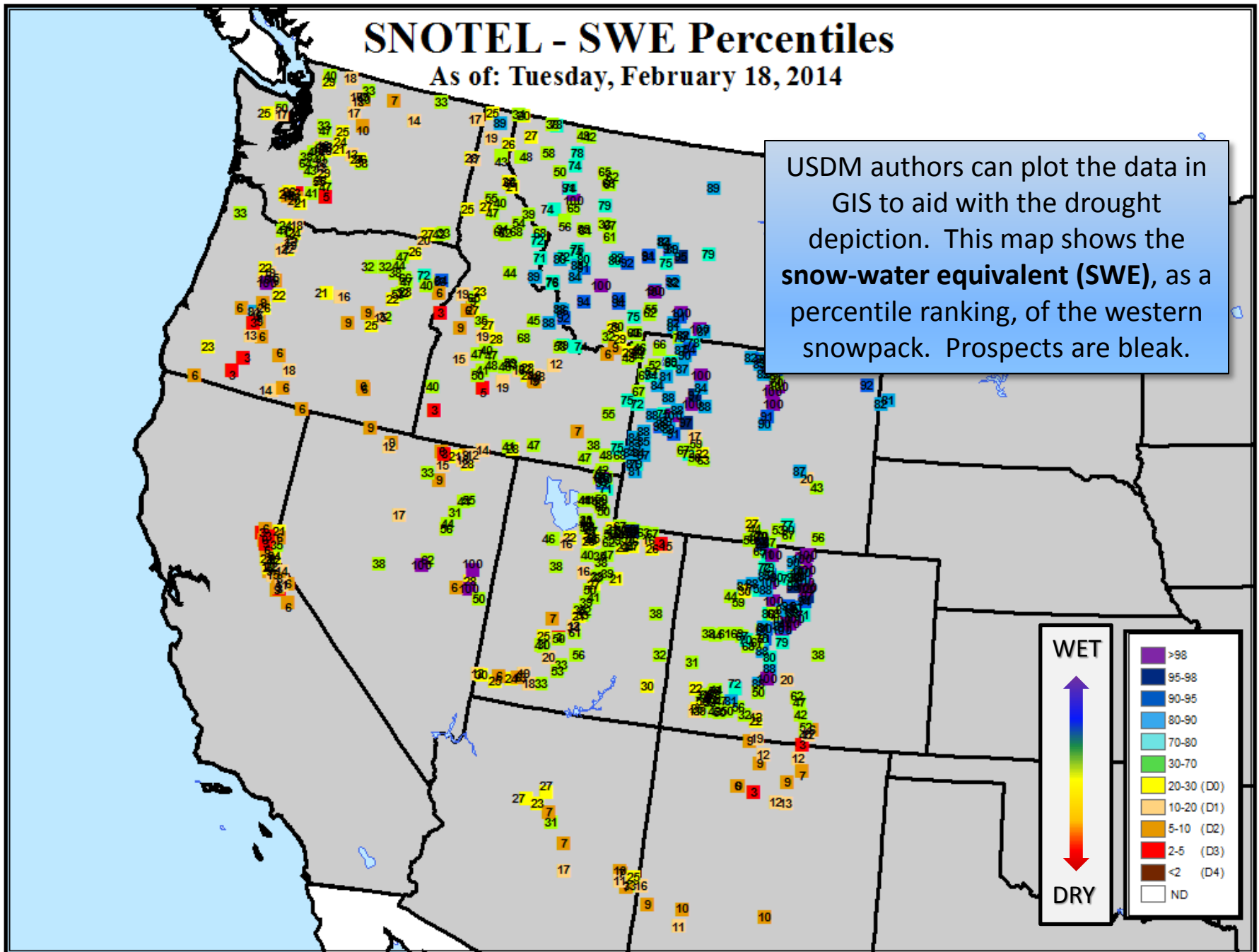
The USDA's Natural Resources Conservation Service (NRCS) operates hundreds of SNOTEL sites (SNOWpack TELEmetry) to help water managers, officials, and the general public gauge the water-supply prospects for the upcoming spring and summer.



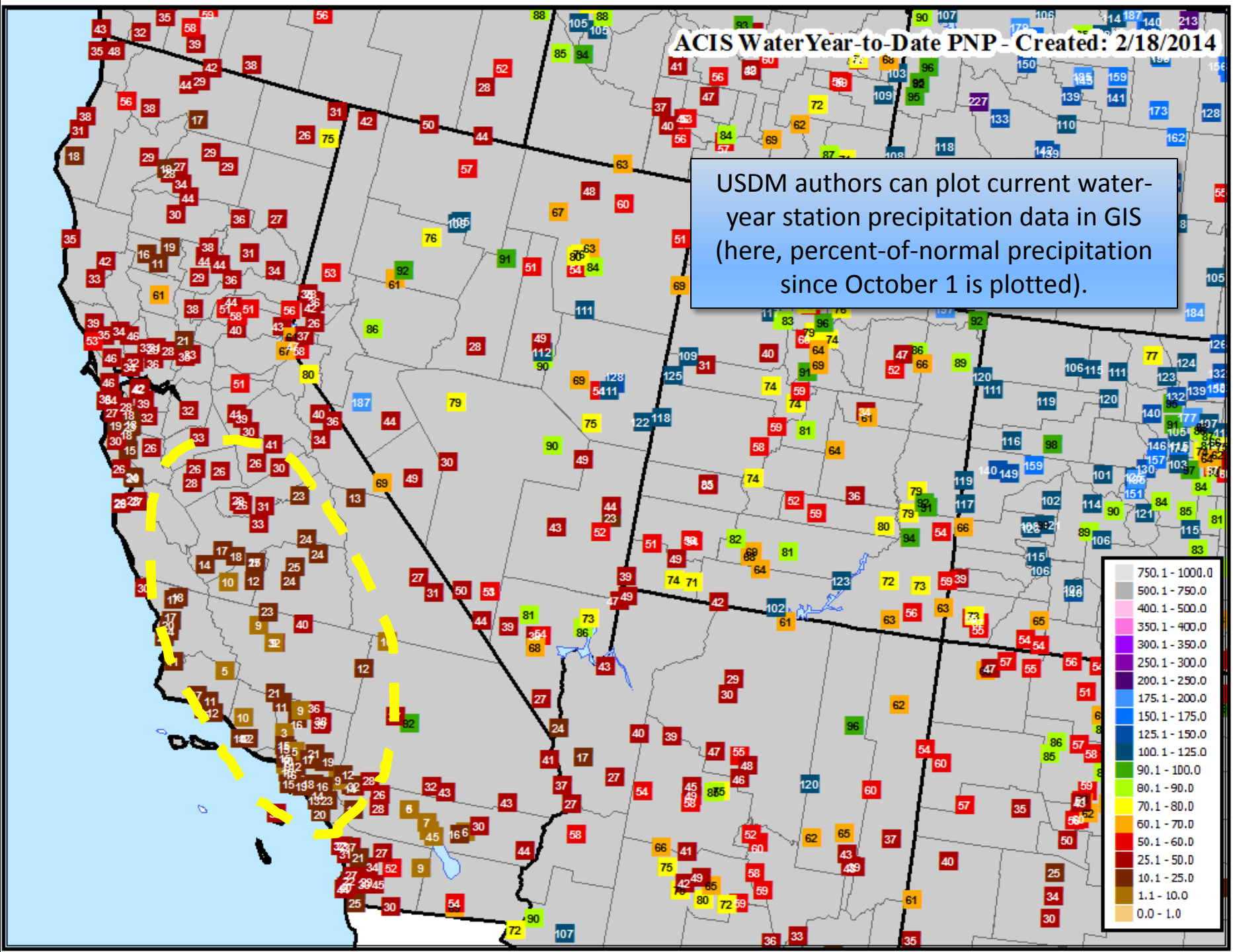
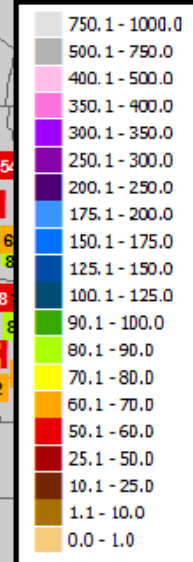
SNOTEL - SWE Percentiles

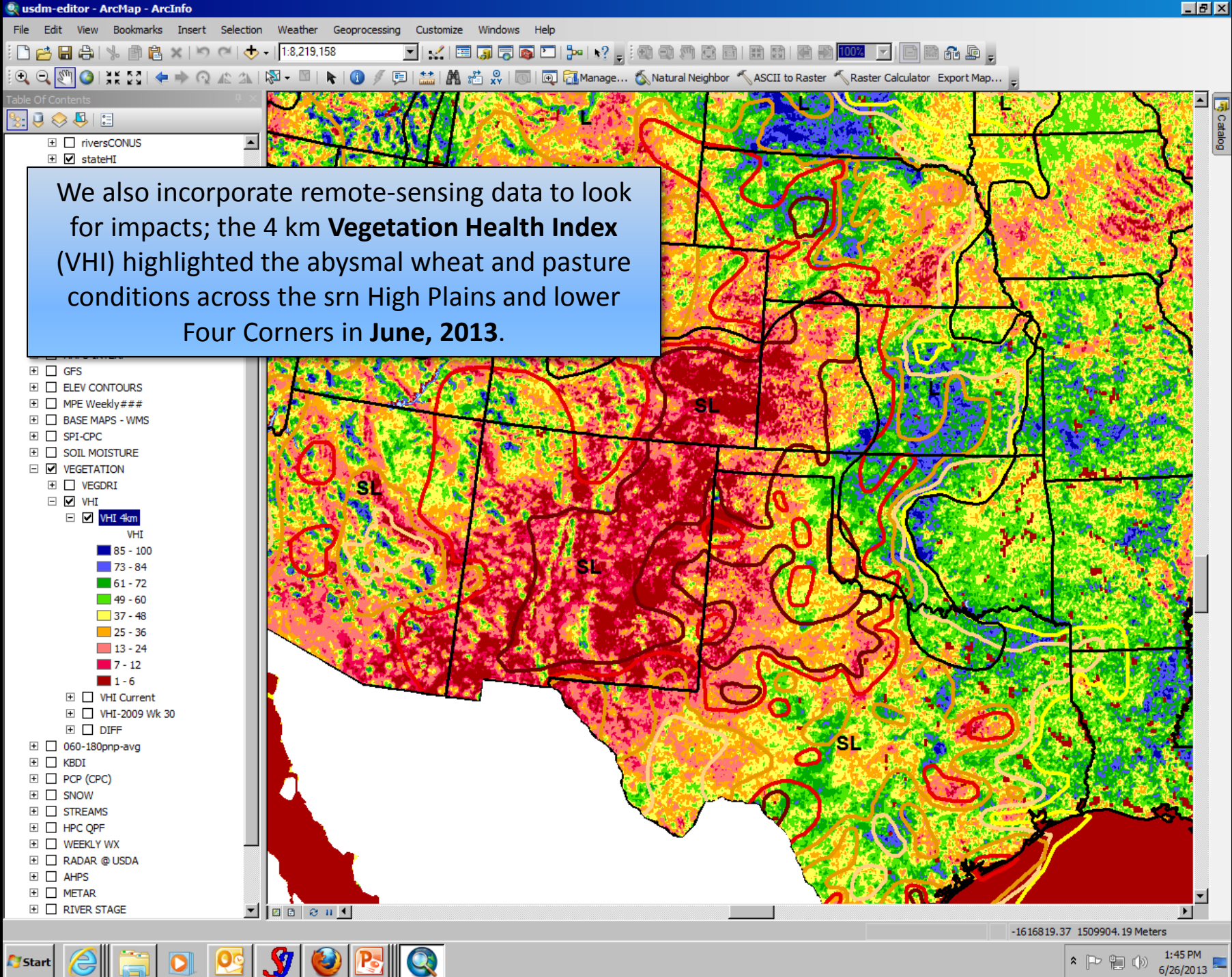
As of: Tuesday, February 18, 2014

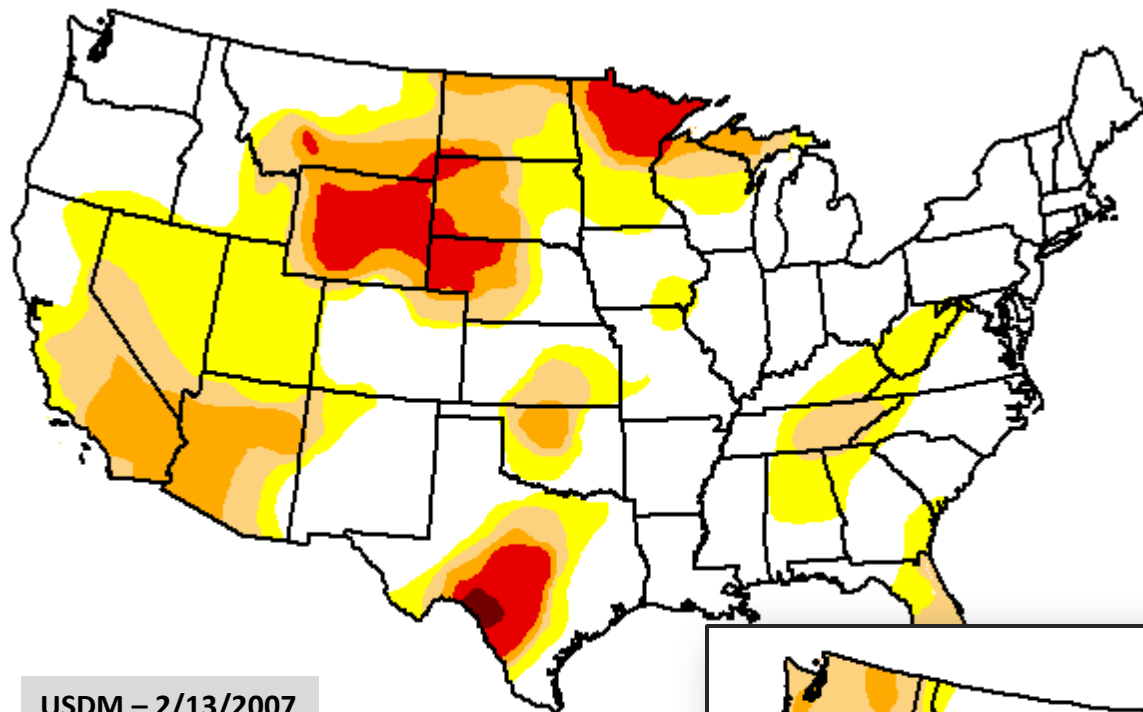
USDM authors can plot the data in GIS to aid with the drought depiction. This map shows the **snow-water equivalent (SWE)**, as a percentile ranking, of the western snowpack. Prospects are bleak.



USDM authors can plot current water-year station precipitation data in GIS (here, percent-of-normal precipitation since October 1 is plotted).

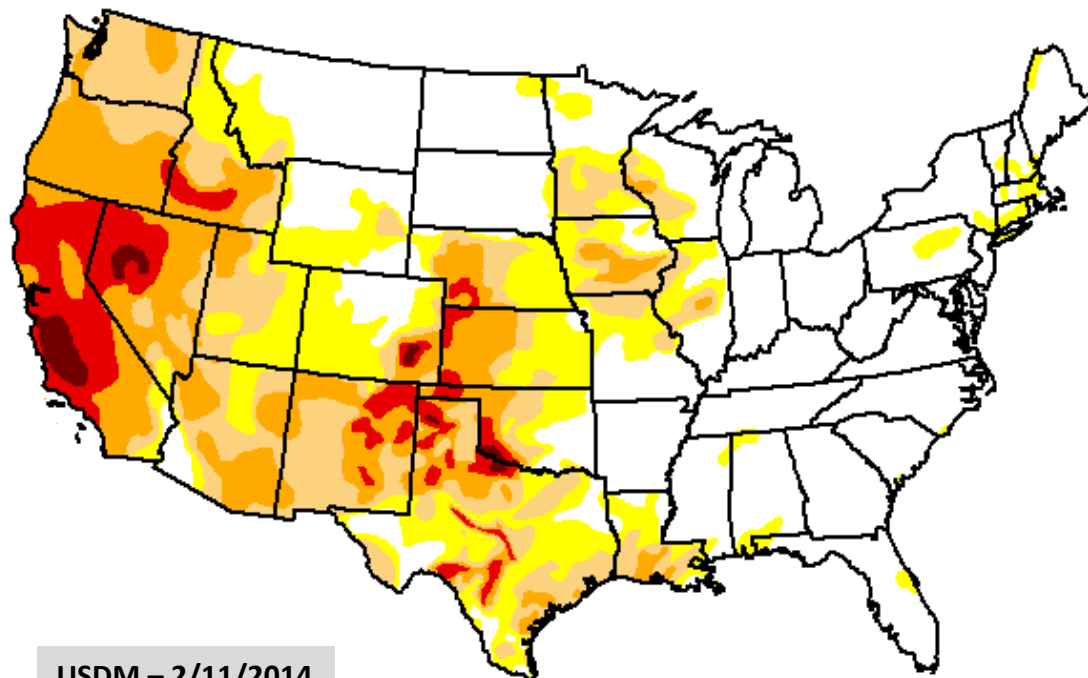






USDM – 2/13/2007

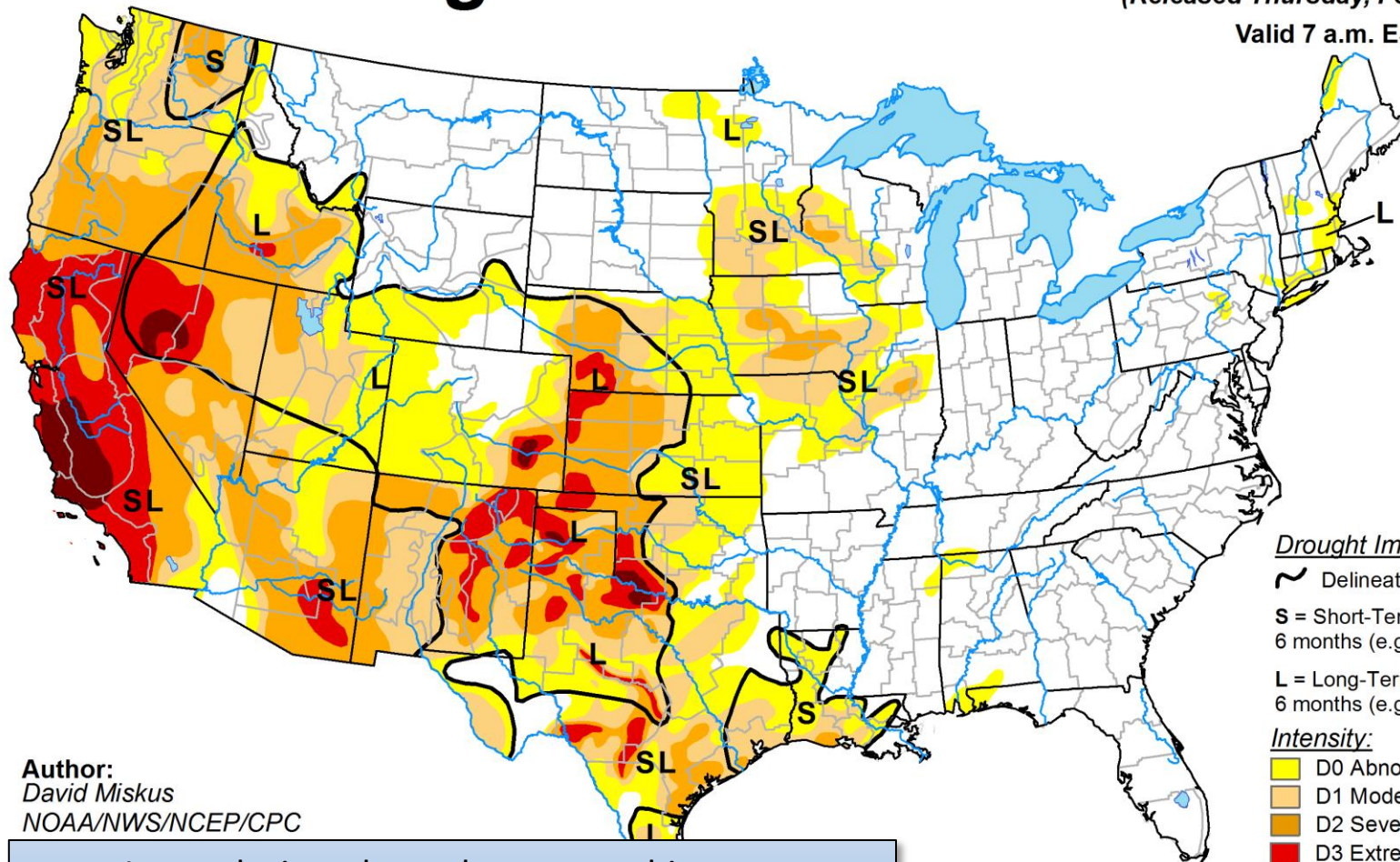
With more input from local experts and higher-resolution datasets, the level of detail in drought depiction has increased considerably over the past 7 years.



USDM – 2/11/2014

U.S. Drought Monitor

February 18, 2014
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Author:
David Miskus
NOAA/NWS/NCEP/CPC

In conclusion, the end user sees this map.
What goes on behind the scenes is far more involved... and entails cooperation from hundreds of local, regional, and nation experts, as well as a myriad of data types and sources. All this work is done by volunteers; there is no Drought Monitor budget.

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

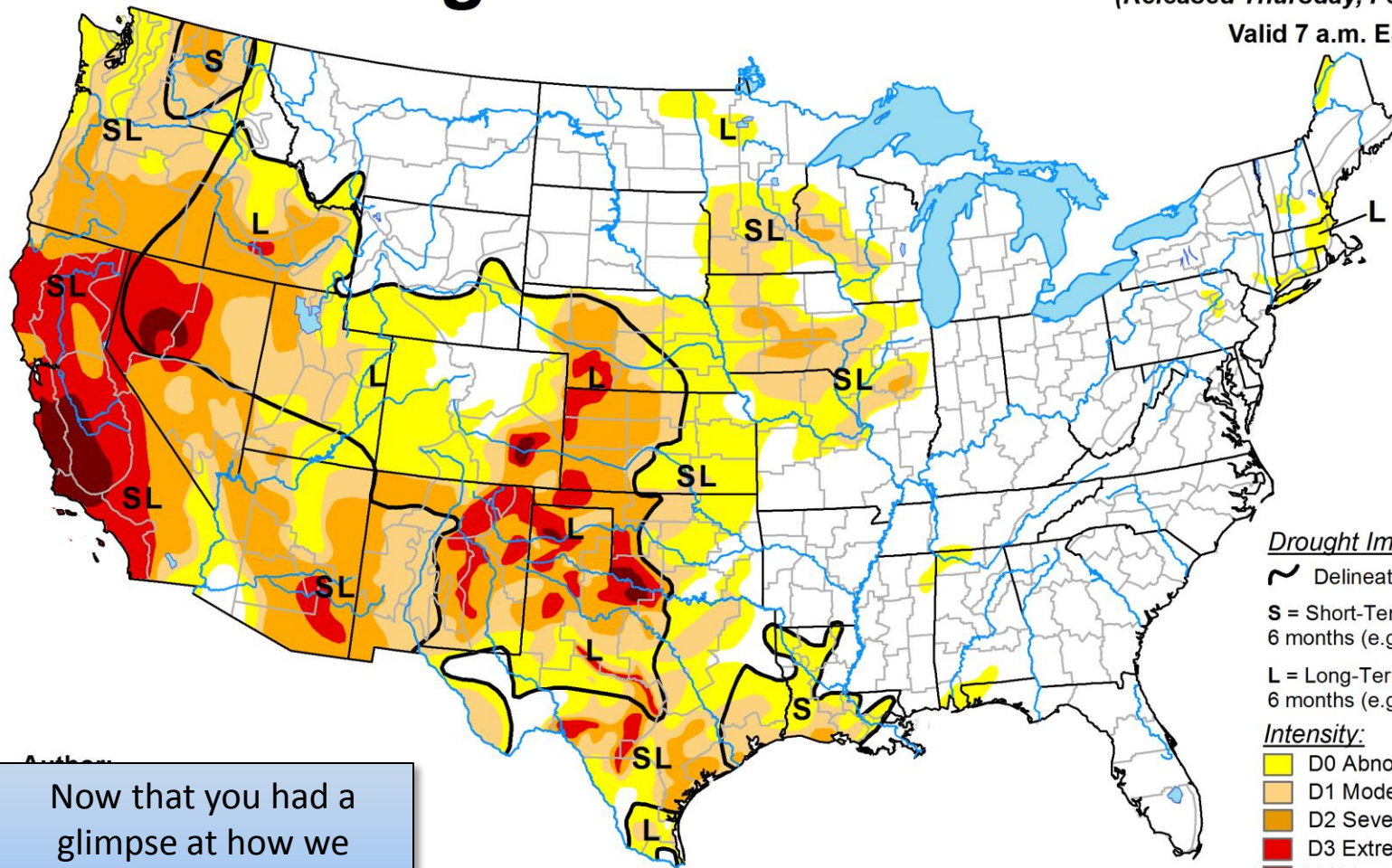
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



<http://droughtmonitor.unl.edu/>

U.S. Drought Monitor

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Drought Impact Types:

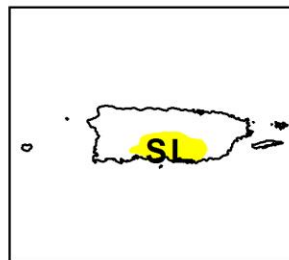
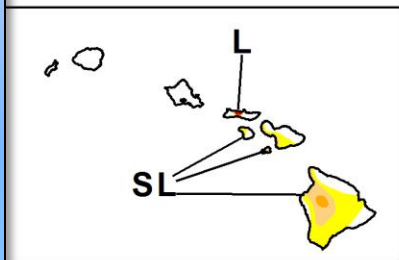
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Now that you had a glimpse at how we create the U.S. Drought Monitor, it's time to turn the page and look at the **Current Drought** situation and the **Weather Outlook**.



<http://droughtmonitor.unl.edu/>

U.S. Drought Monitor

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Thank You!

Eric Luebehusen
Meteorologist & USDM Author

Author:
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NOAA/NWS/NCEP/CPC

USDA, OCE, World Agricultural Outlook Board
Washington, D.C.

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(202) 720-3361

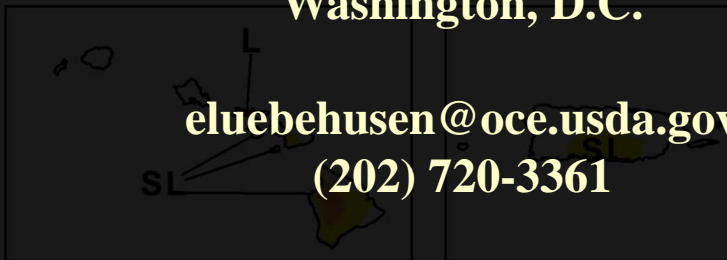
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