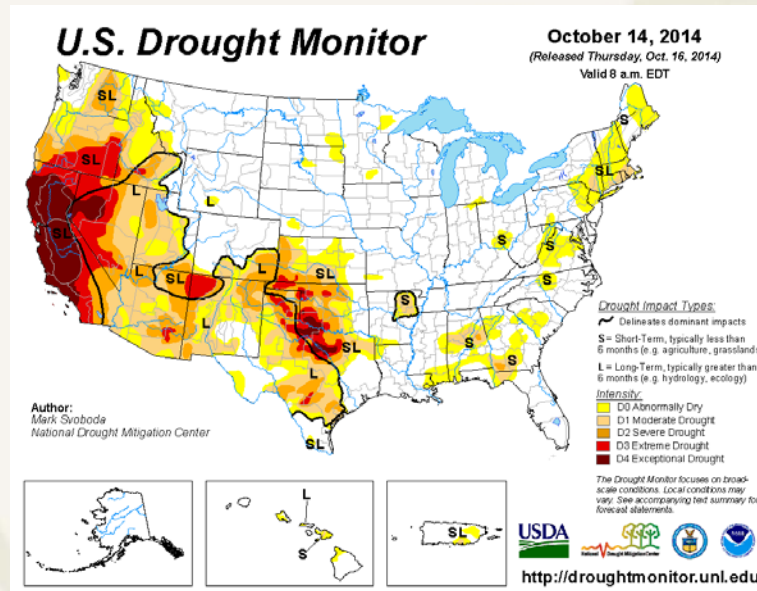


The U.S. Drought Monitor: From Data to D-x



**Mark Svoboda, Climatologist
Monitoring Program Area Leader**

**National Drought Mitigation Center
School of Natural Resources
University of Nebraska-Lincoln**

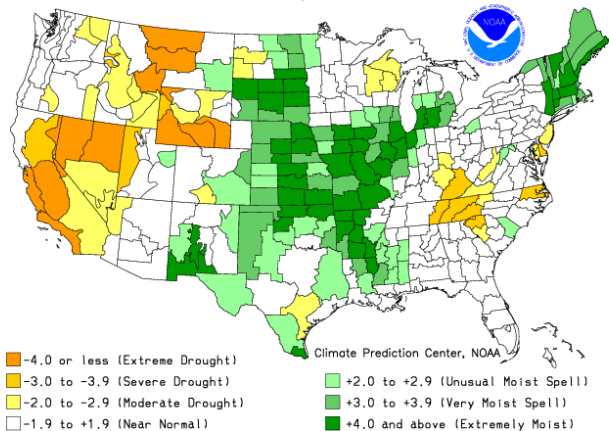
UC-Davis Drought Monitor Workshop, Davis, CA, November 7, 2014



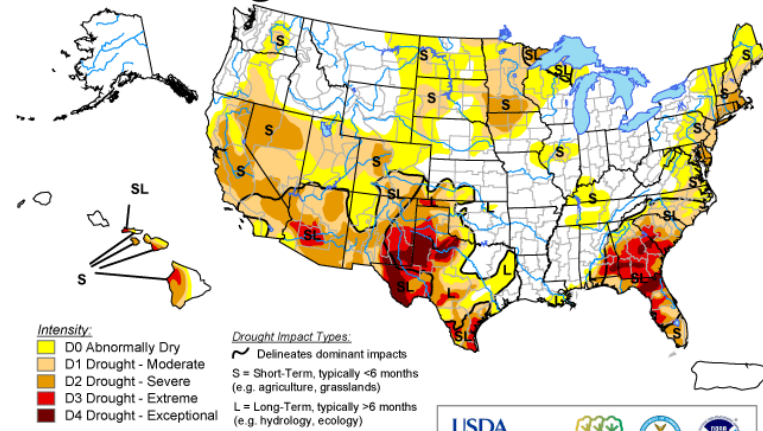
Approaches to Drought Assessment

- ▶ Single index or indicator (parameter)
- ▶ Multiple indices or indicators
- ▶ **Composite (or "hybrid") Indicator**

Drought Severity Index by Division
Weekly Value for Period Ending OCT 18, 2008
Long Term Palmer



U.S. Drought Monitor April 10, 2012
Valid 7 a.m. EDT



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

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



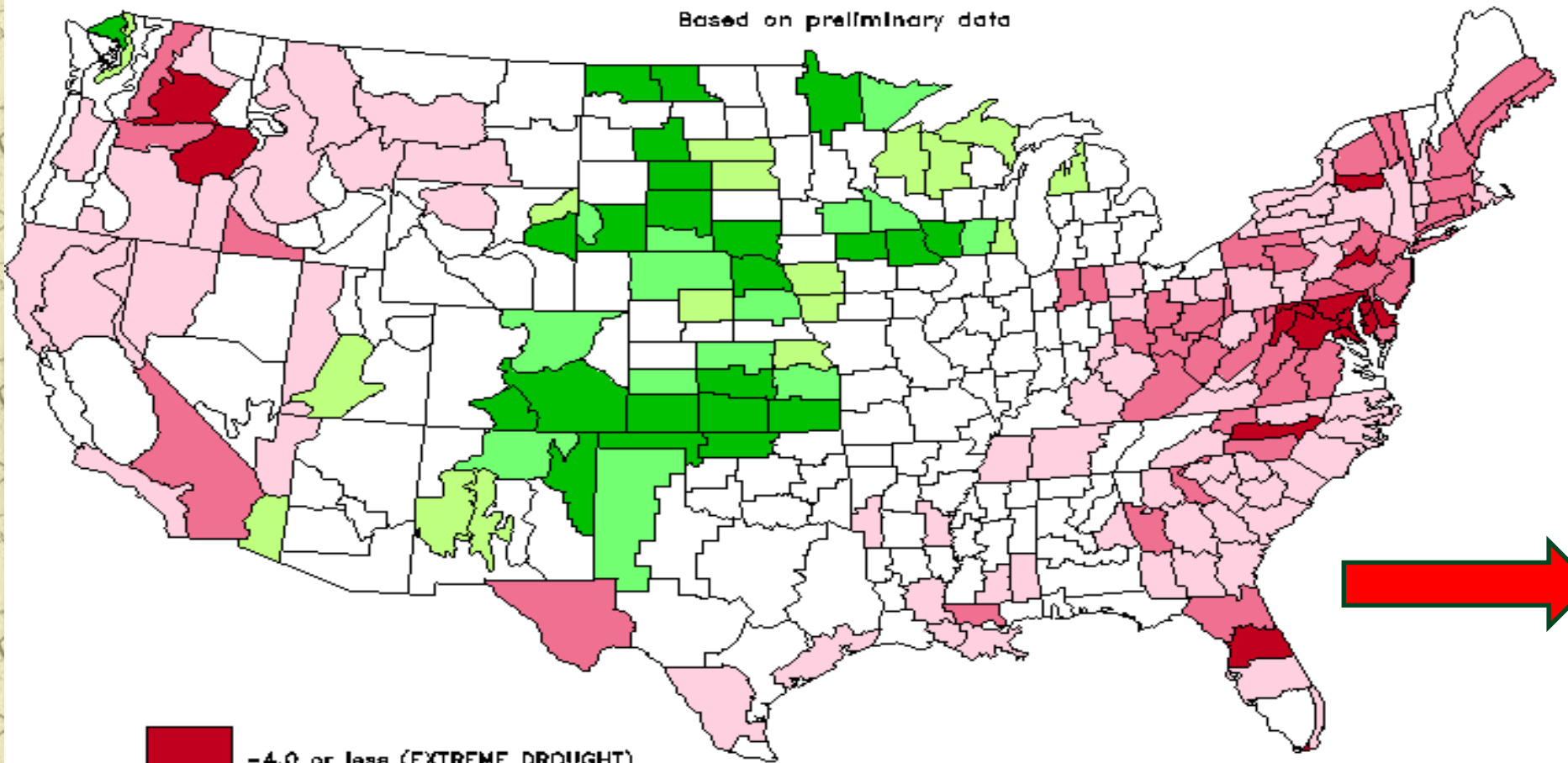
Released Thursday, April 12, 2012
Author: David Miskus, NOAA/NWS/NCEP/CPC










DROUGHT SEVERITY INDEX BY DIVISION (LONG TERM PALMER)

AUG 7, 1999

Based on preliminary data



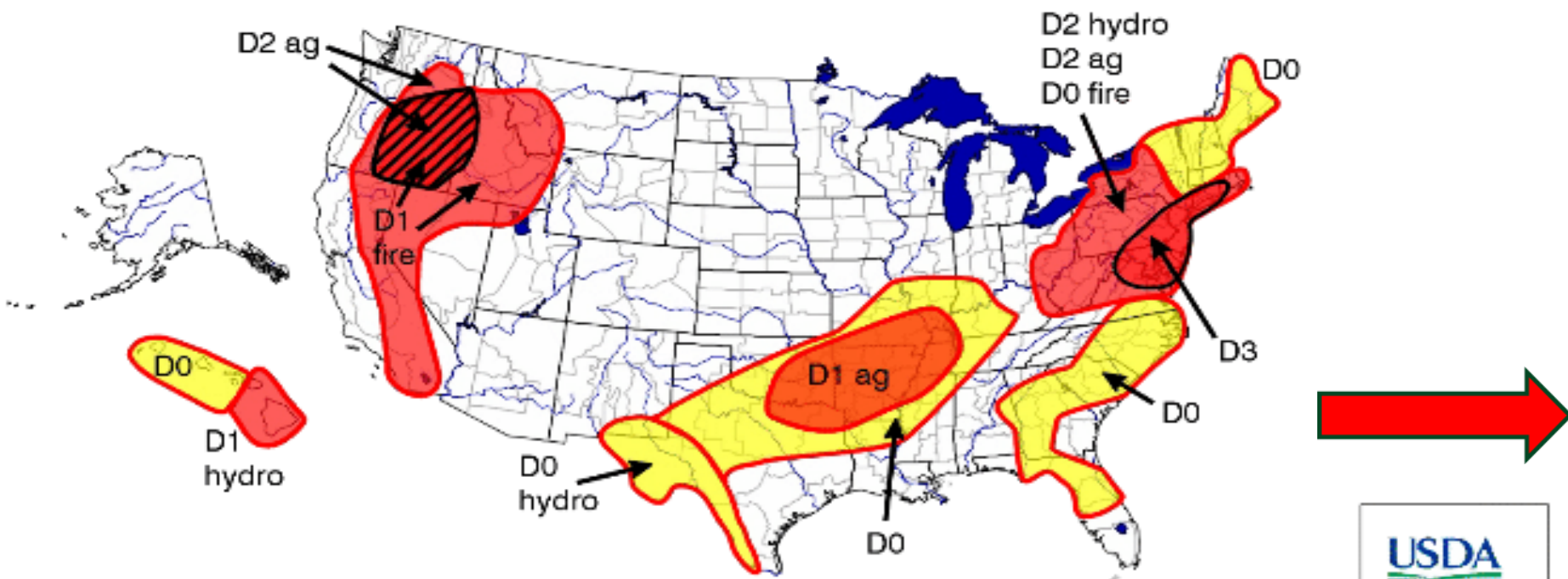
-  -4.0 or less (EXTREME DROUGHT)
-  -3.0 to -3.9 (SEVERE DROUGHT)
-  -2.0 to -2.9 (MODERATE DROUGHT)
-  -1.9 to +1.9 (NEAR NORMAL)

-  +2.0 to +2.9 (UNUSUAL MOIST SPELL)
-  +3.0 to +3.9 (VERY MOIST SPELL)
-  +4.0 and above (EXTREMELY MOIST)



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)

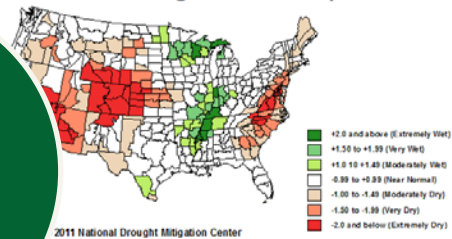
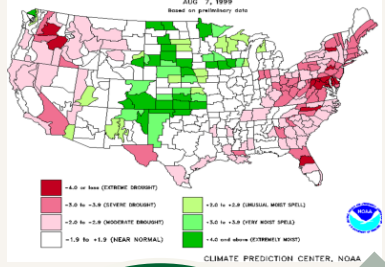
Fire = forestry (wildfire potential)

Hydro = hydrological (rivers, wells, reservoirs)

Plus (+) = Forecast to intensify

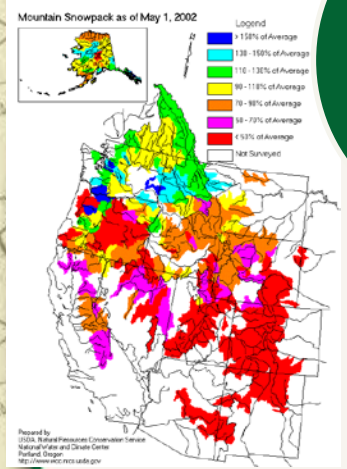
Minus (-) = Forecast to diminish



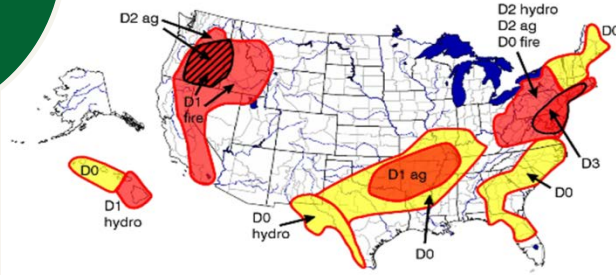


Indices: SPI/PDSI

Snow



August 3, 1999 Experimental U.S. Drought Map



"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)

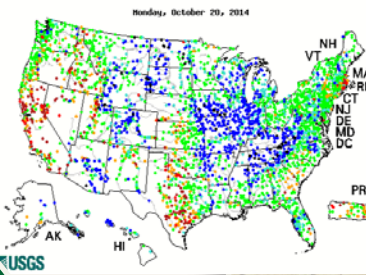
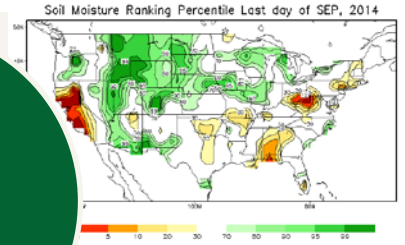
Red (D1-D4) = Current drought ranging in severity from standard (D1) to severe (D2-D3) to extreme (D4)

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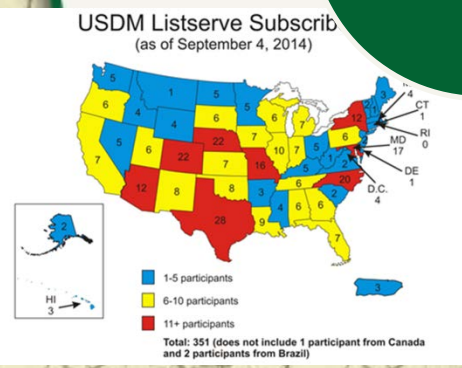
Plus (+) = Forecast to intensify
 Minus (-) = Forecast to diminish

Soil Moisture

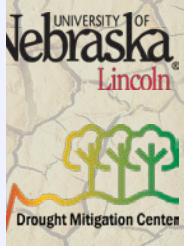
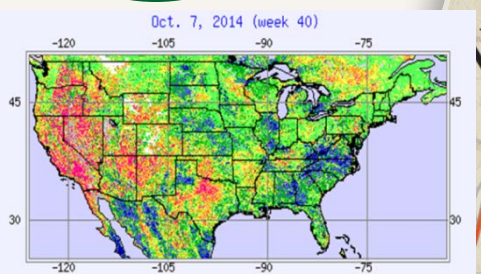


Streamflow

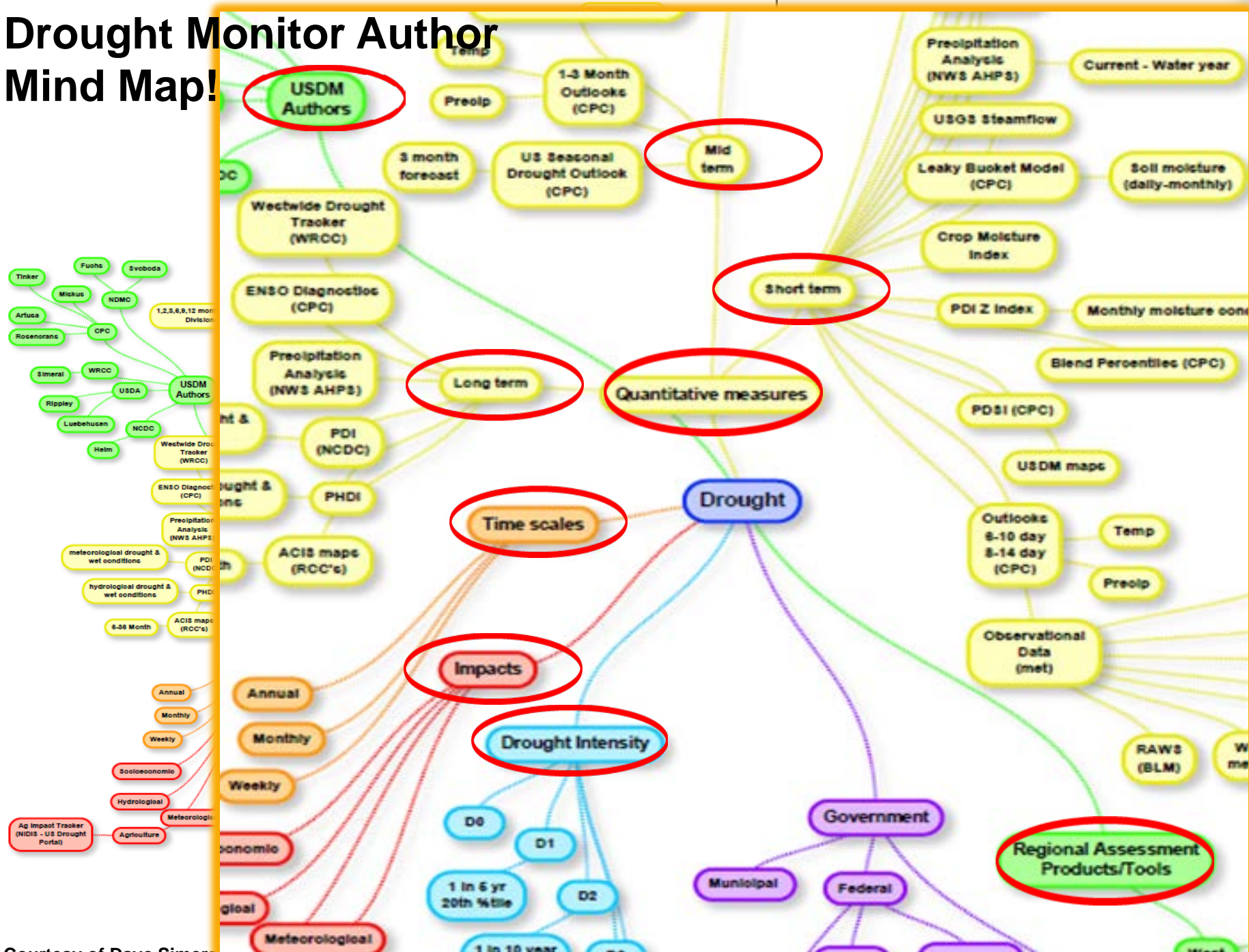
Expert Local Input



Remote Sensing



Drought Monitor Author Mind Map!





PACKERS

Fathead
SCENS



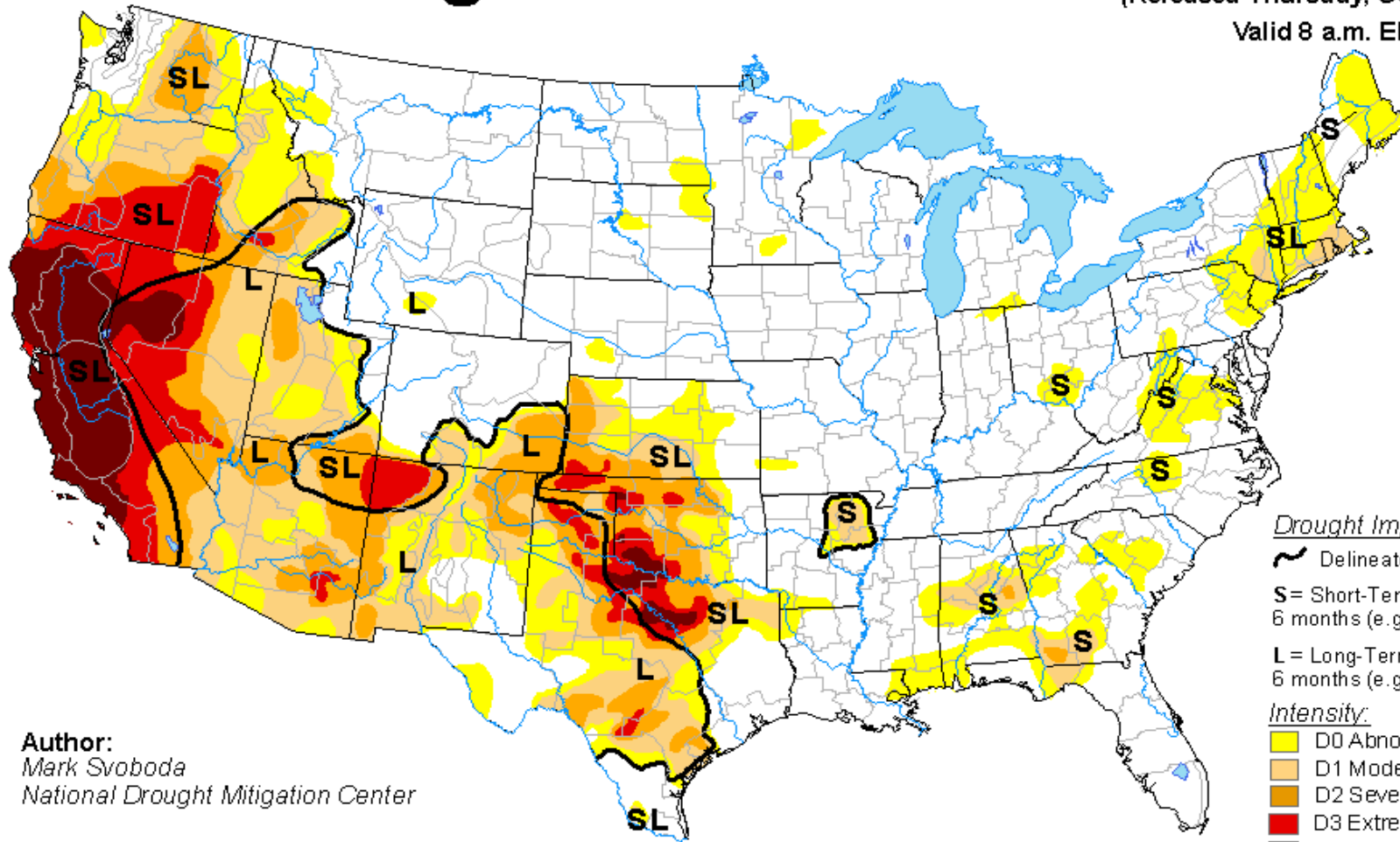
© 2010 NFLP

U.S. Drought Monitor

October 14, 2014

(Released Thursday, Oct. 16, 2014)

Valid 8 a.m. EDT



Author:
Mark Svoboda
National Drought Mitigation Center

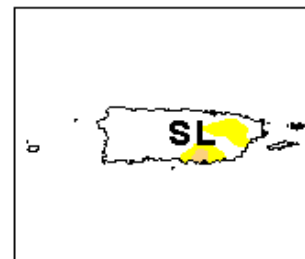
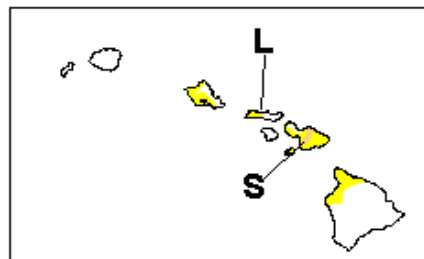
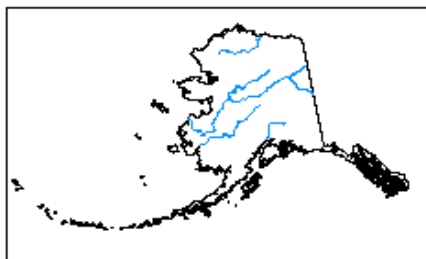
Drought Impact Types:

- ~ 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.



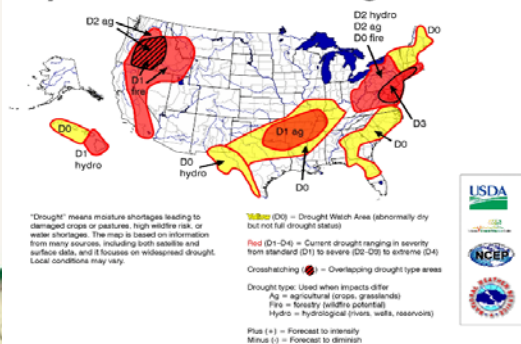
<http://droughtmonitor.unl.edu/>

The U.S. Drought Monitor

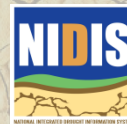
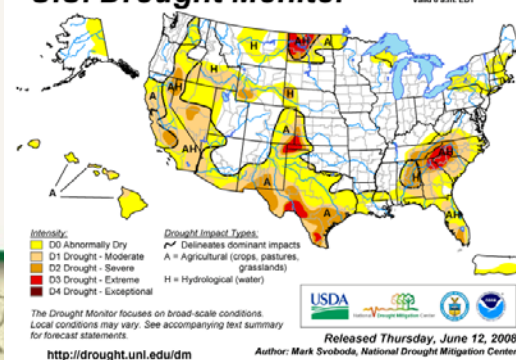
Since 1999, **NOAA (CPC, NCDC, WRCC), USDA, and the NDMC** have produced a weekly composite drought map -- the U.S. Drought Monitor -- with input from numerous federal and non-federal agencies

- **Western Region Climate Center** on board 2008
- **11** authors in all
- **Incorporate** relevant information and products from all entities (and levels of government) dealing with drought (RCC's, SC's, federal/state agencies, etc.) **(350+ experts)**

August 3, 1999
Experimental U.S. Drought Monitor



U.S. Drought Monitor June 10, 2008
Valid 8 a.m. EDT





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

Objectives



- ▶ Assessment of **current** conditions
- ▶ **NOT** an index
- ▶ **NOT** a model
- ▶ **NOT** a forecast or drought declaration
- ▶ Identify **impacts** (S, L)
- ▶ Incorporate **local expert** input
- ▶ Be as **objective** as possible (*percentiles*)
- ▶ ***“Convergence of evidence”*** approach



USDM Approach

▶ “Convergence of Evidence”

- Many types of drought “information” can be collectively analyzed to **determine if the majority of information is ‘converging’ (telling the same story)** about the accuracy, or inaccuracy, of the drought as depicted by the USDM
- Need to **look at 100% of the data, BUT don’t believe in any one piece of data input 100%** in making a decision...
- **Multiple indicators and types of information** that describe different hydroclimatic parameters are needed to get a complete picture of a drought indicator’s performance
- **Impacts are the “ground truth”**, yet aren’t monitored...you can’t measure what you don’t monitor!








Percentiles and the U.S. Drought Monitor

► Advantages of percentiles:

- Can be ***applied to any parameter***

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

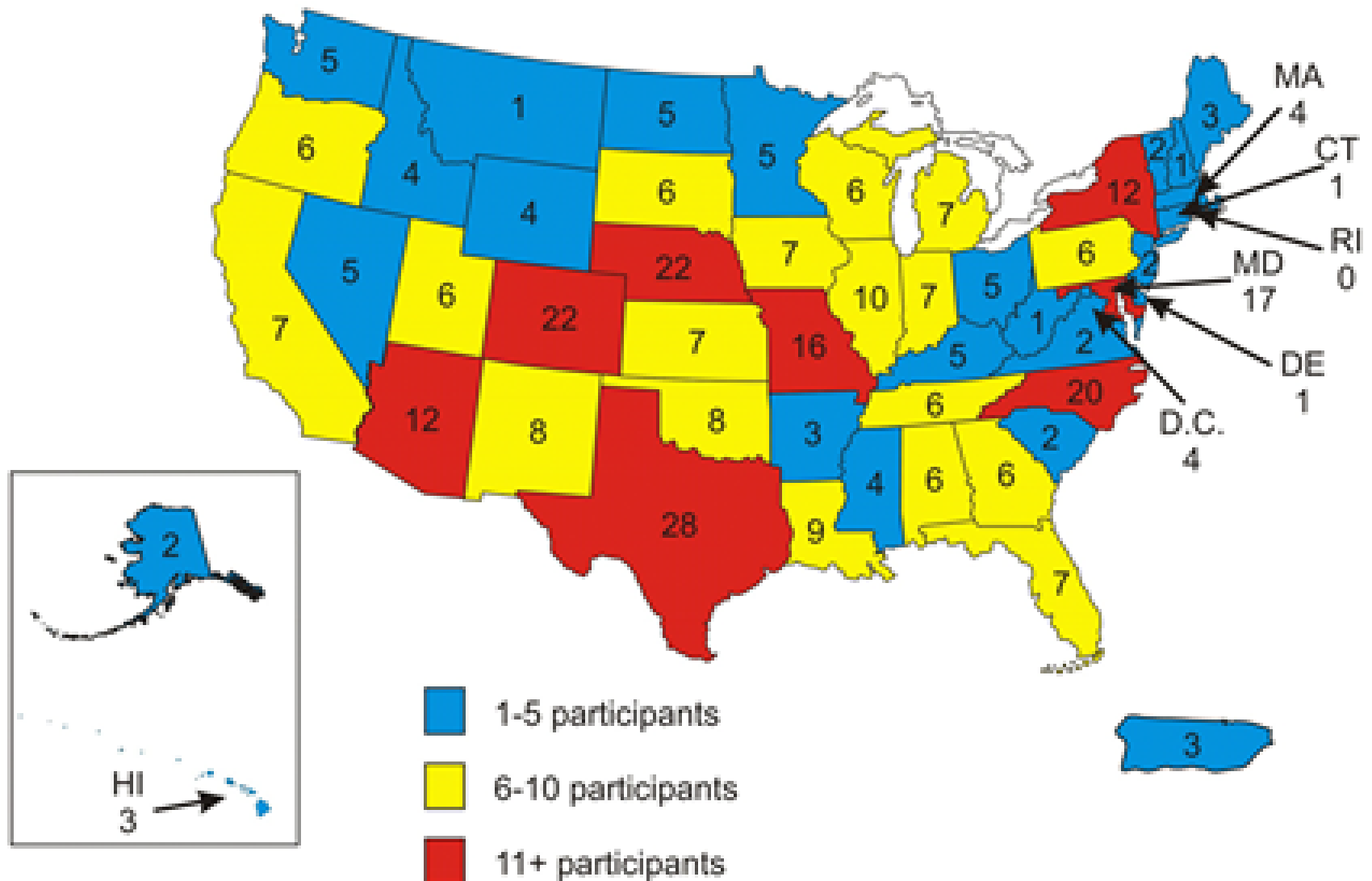
It is not anecdotal or subjective, like “It’s really, really dry!!”or, “I don’t remember it ever being this dry, we have to be D4!!”

- D4: Exceptional Drought  (***2nd*** percentile)
- D3: Extreme Drought  (***5th*** percentile)
- D2: Severe Drought  (***10th*** percentile)
- D1: Moderate Drought  (***20th*** percentile)
- D0: Abnormally Dry  (***30th*** percentile)

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

USDM Listserve Subscribers

(as of September 4, 2014)



Total: 351 (does not include 1 participant from Canada and 2 participants from Brazil)

Regional and Local Feedback/Input Process

- ▶ Annual User **Feedback Forums** (USDAM/NADM) since 2000
- ▶ Various webinars/telecons/reports/data/products
- ▶ **Regional Climate Centers** and NOAA **Regional Climate Service Directors and Coordinators** along w/ **Weather Forecast Offices (WFOs)**
- ▶ **State Climatologists**
- ▶ **Navajo Tribe**
- ▶ **CoCoRaHS (impacts)**
- ▶ National Integrated Drought Information System (**NIDIS**) **Pilot RDEWS** basin webinars:
 - UCRB (Upper Colorado River Basin)
 - ACF (Apalachicola-Chattahoochee-Flint)
 - Southern Plains
 - MORB (Missouri River Basin)
- ▶ **Drought Task Forces**: North Carolina, Hawaii, Oklahoma, Texas, New Mexico, Alabama, Florida, South Dakota, Kentucky, Arizona, Montana and California



U.S. Drought Monitor

Integrates Key Drought Indicators:

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

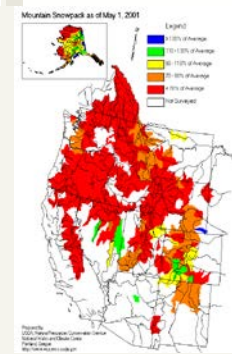
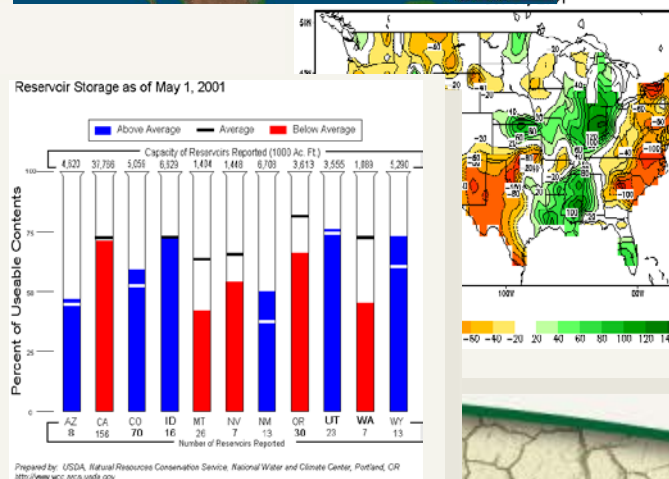
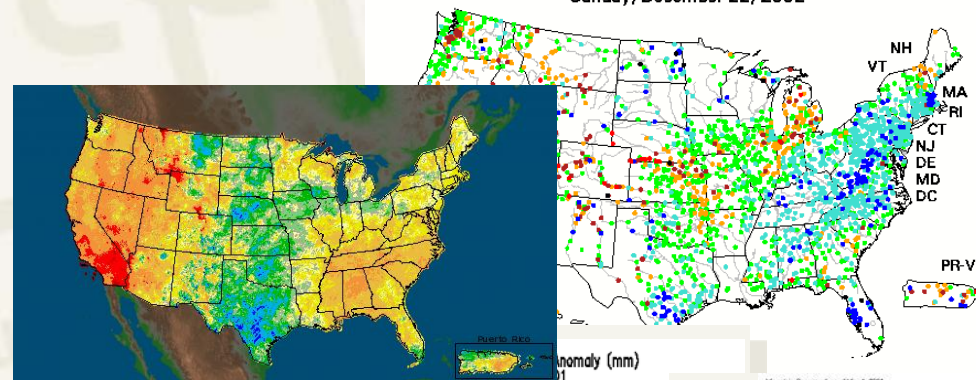
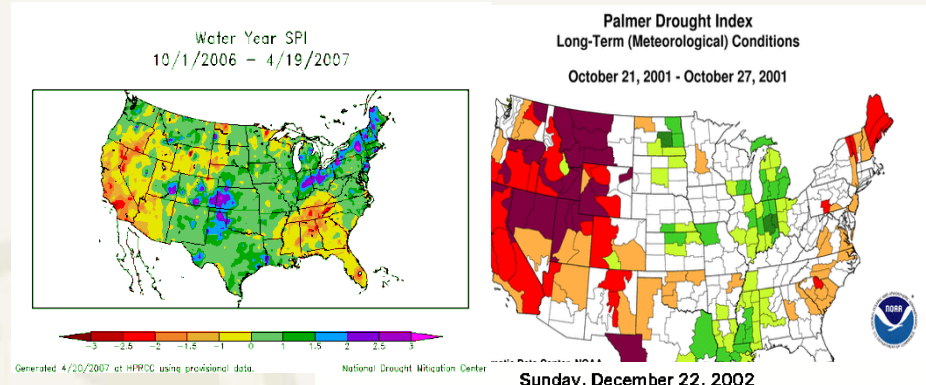
Growing Season:

- Crop Moisture Index
- Sat. Veg. Health Index
- VegDRI/ESI/etc.
- Soil Moisture
- Mesonets
- State/Regional

In The West:

- SWSI
- Reservoir levels
- Snowpack (SNOTEL)
- SWE
- Streamflow

Created in ArcGIS

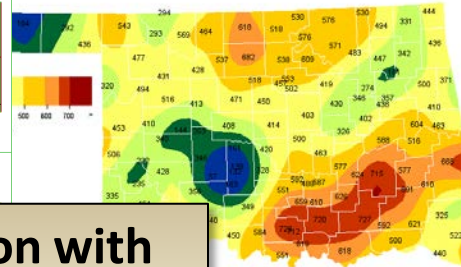
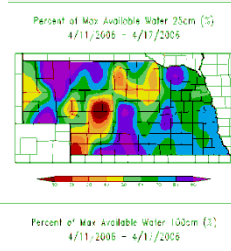
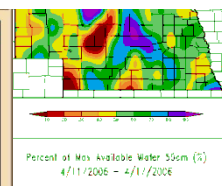
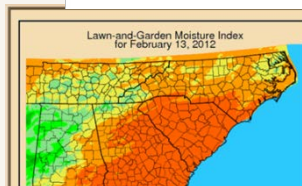
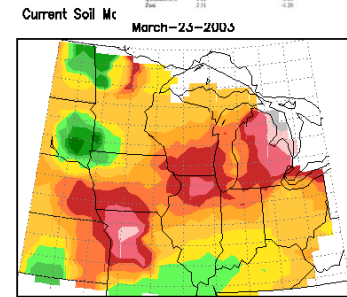
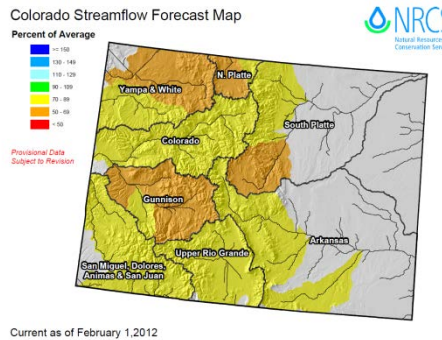
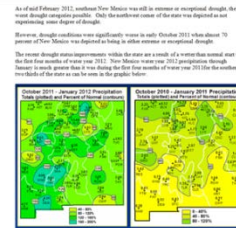
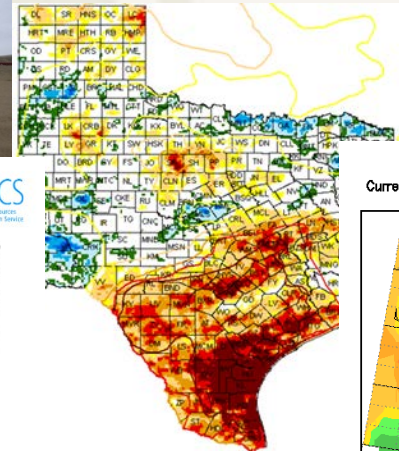


The Importance of Local Expert Input

- ▣ 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 Offices
- State Climate Offices
- State Drought Task Forces
- University Extension
- Regional Climate Centers
- NIDIS Basin Webinars



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

As of mid February 2012, southeast Texas moisture was still in excess or near-normal despite the recent drought mitigation efforts. Still the rainfall deficit of the state was reported as an ongoing concern by the state.

However, drought conditions were significantly worse in early October 2011 when about 70 percent of Texas moisture was reported as being in deficit or near-normal drought.

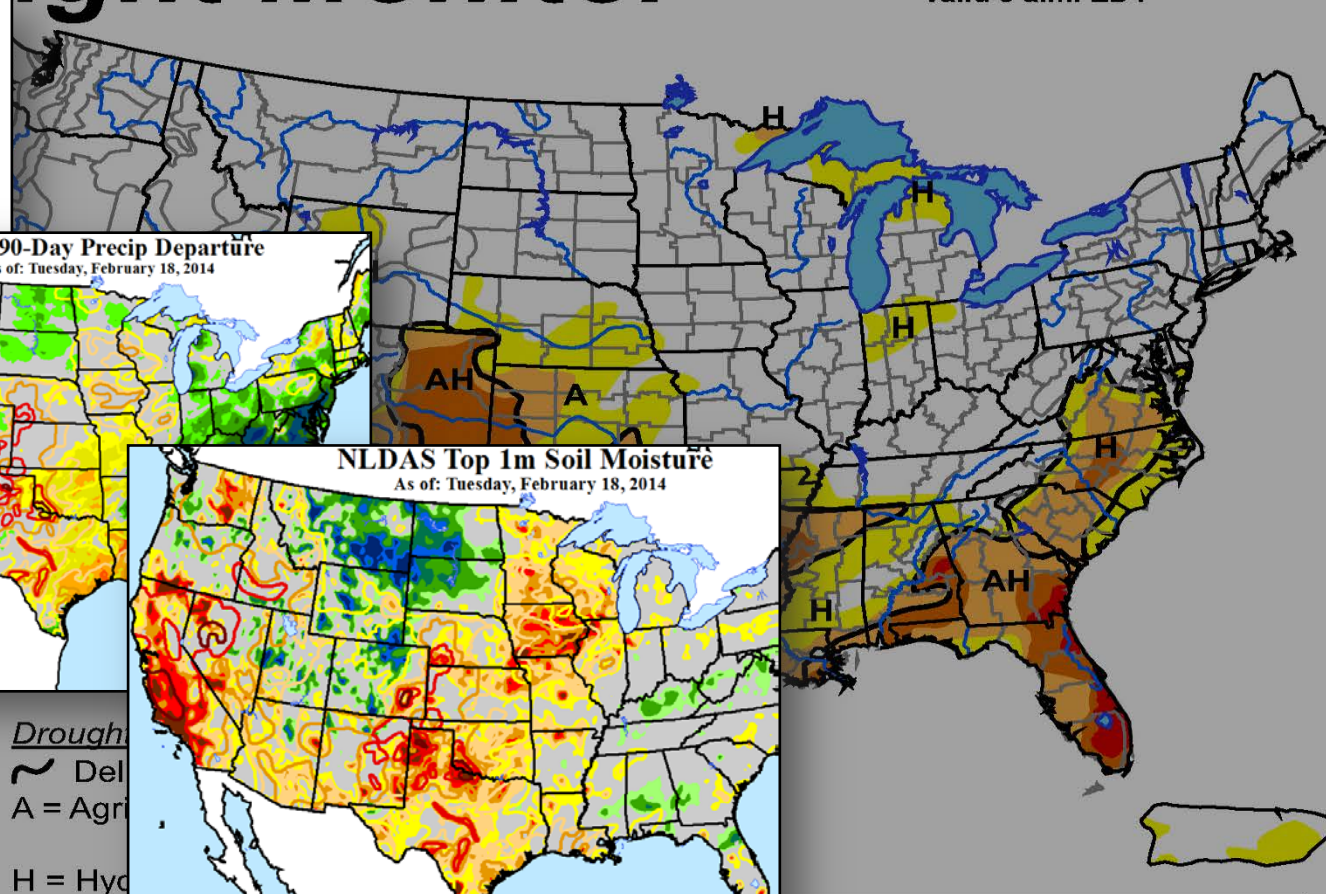
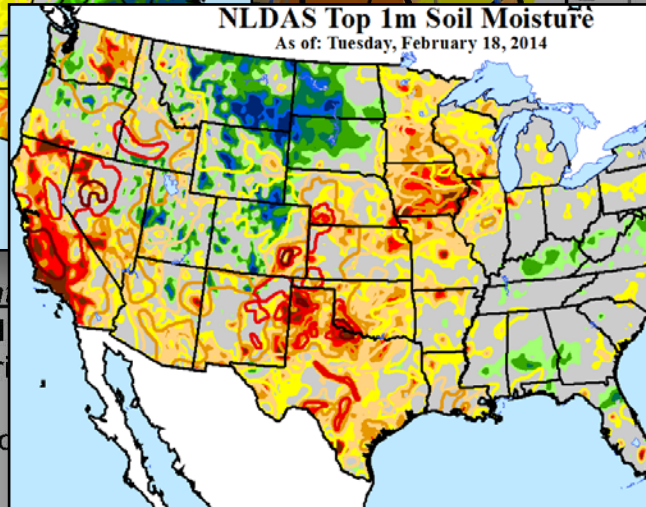
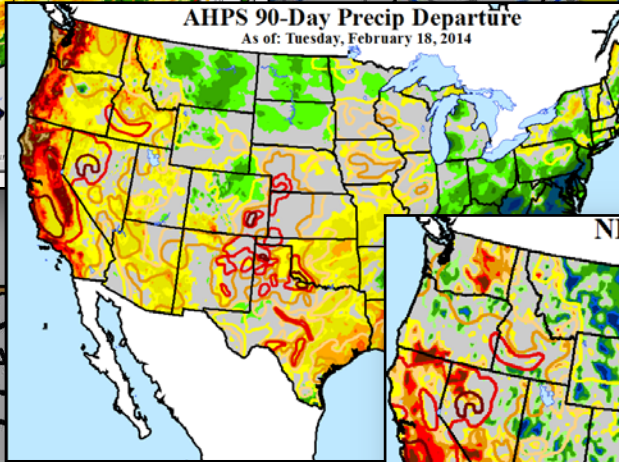
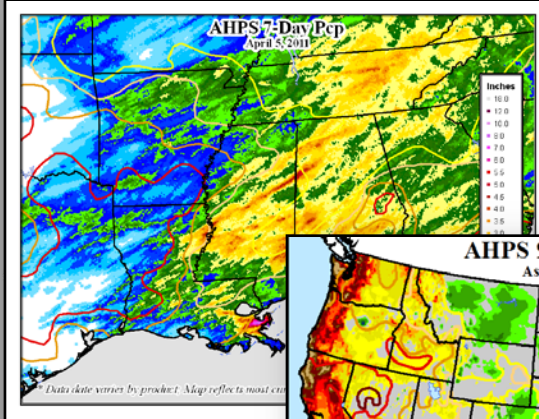
The recent drought mitigation efforts within the state as a result of a winter that started with the first few months of 2012. The moisture was not the 2012 precipitation through August. Overall, the state was still in deficit in 2012 over the number of years in the graph below.

State	2011 Precipitation	2012 Precipitation	2011-2012 Precipitation
Alabama	47.2	47.2	0.0
Arkansas	47.2	47.2	0.0
California	23.6	23.6	0.0
Colorado	15.0	15.0	0.0
Florida	47.2	47.2	0.0
Georgia	47.2	47.2	0.0
Idaho	15.0	15.0	0.0
Illinois	47.2	47.2	0.0
Indiana	47.2	47.2	0.0
Iowa	47.2	47.2	0.0
Kansas	15.0	15.0	0.0
Kentucky	47.2	47.2	0.0
Louisiana	47.2	47.2	0.0
Maine	47.2	47.2	0.0
Maryland	47.2	47.2	0.0
Massachusetts	47.2	47.2	0.0
Michigan	47.2	47.2	0.0
Minnesota	47.2	47.2	0.0
Mississippi	47.2	47.2	0.0
Missouri	47.2	47.2	0.0
Montana	15.0	15.0	0.0
Nebraska	15.0	15.0	0.0
Nevada	15.0	15.0	0.0
New Hampshire	47.2	47.2	0.0
New Jersey	47.2	47.2	0.0
New Mexico	15.0	15.0	0.0
New York	47.2	47.2	0.0
North Carolina	47.2	47.2	0.0
North Dakota	15.0	15.0	0.0
Ohio	47.2	47.2	0.0
Oklahoma	15.0	15.0	0.0
Oregon	15.0	15.0	0.0
Pennsylvania	47.2	47.2	0.0
Rhode Island	47.2	47.2	0.0
South Carolina	47.2	47.2	0.0
South Dakota	15.0	15.0	0.0
Tennessee	47.2	47.2	0.0
Texas	15.0	15.0	0.0
Utah	15.0	15.0	0.0
Vermont	47.2	47.2	0.0
Virginia	47.2	47.2	0.0
Washington	15.0	15.0	0.0
West Virginia	47.2	47.2	0.0
Wisconsin	47.2	47.2	0.0
Wyoming	15.0	15.0	0.0

U.S. Drought Monitor

March 22, 2011

Valid 8 a.m. EDT



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

- Drought**
- Del
 - A = Agr
 - H = Hyd

2008-2011 - Several authors 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

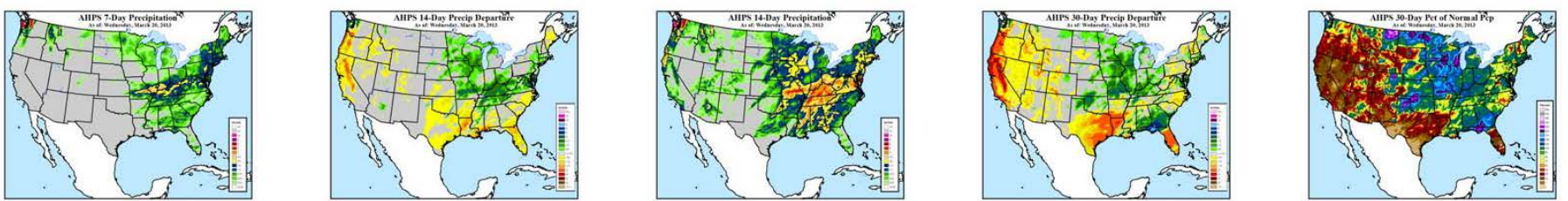
2007

2009

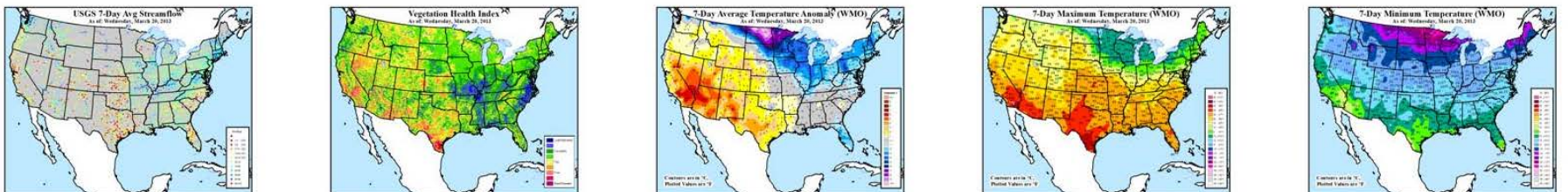
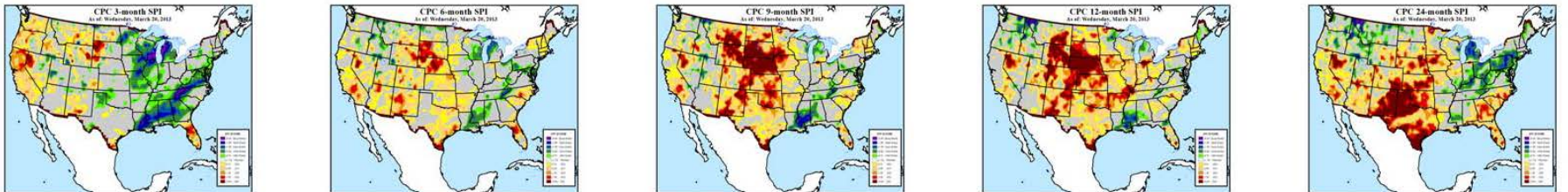
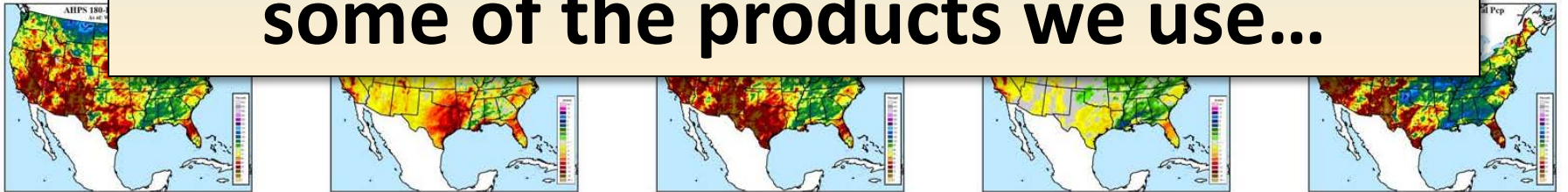
2011

2013

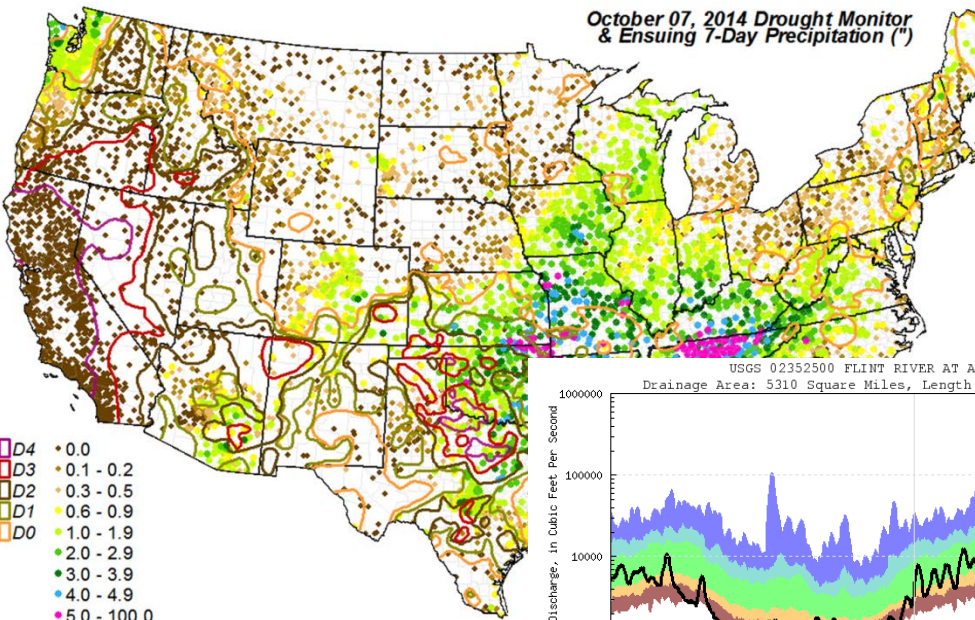




What follows is a very small sample of some of the products we use...

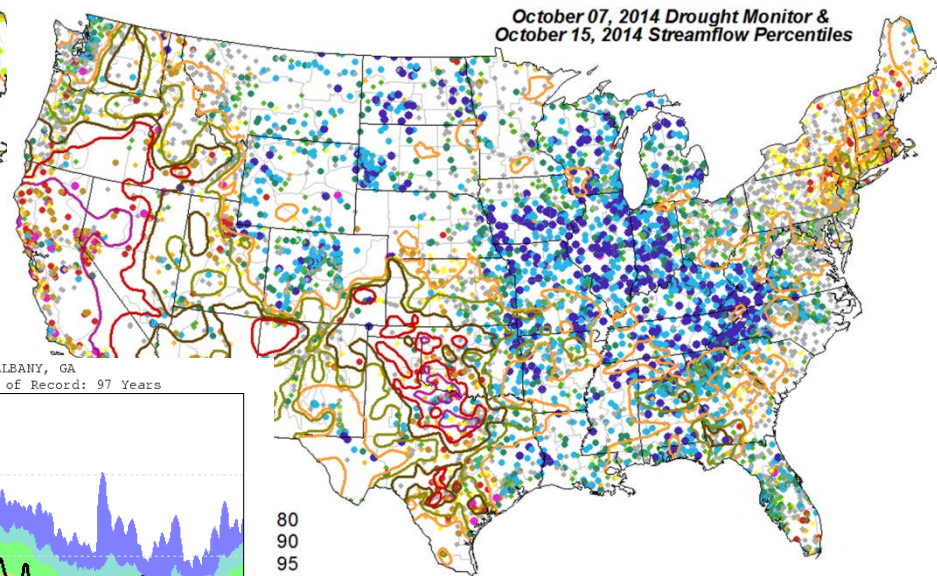


October 07, 2014 Drought Monitor & Ensuing 7-Day Precipitation (*)

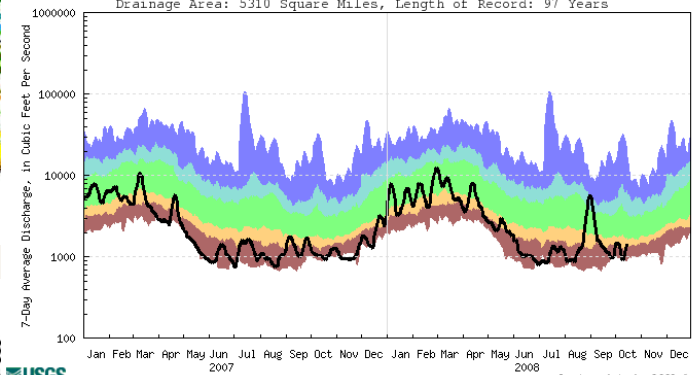


- D4 0.0
- D3 0.1 - 0.2
- D2 0.3 - 0.5
- D1 0.6 - 0.9
- D0 1.0 - 1.9
- 2.0 - 2.9
- 3.0 - 3.9
- 4.0 - 4.9
- 5.0 - 100.0

October 07, 2014 Drought Monitor & October 15, 2014 Streamflow Percentiles

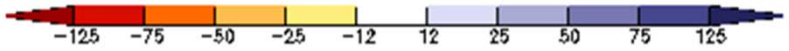
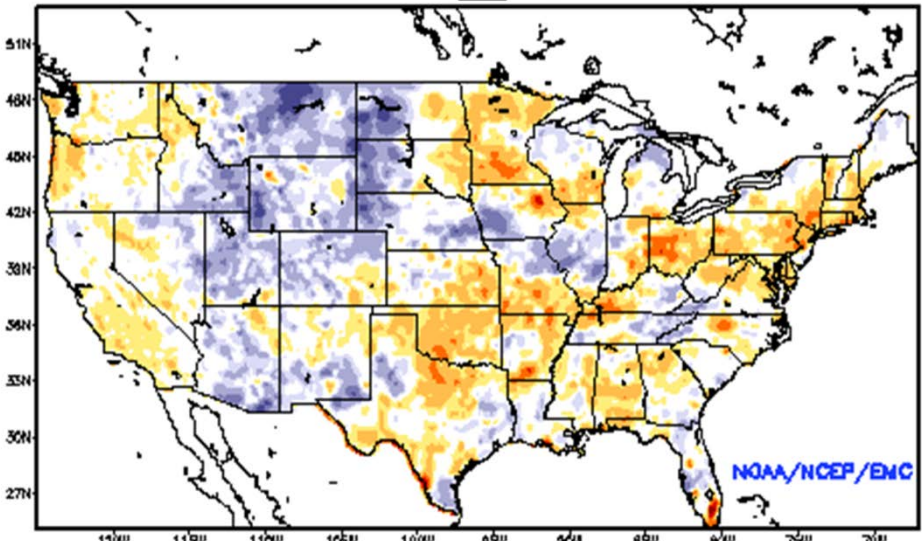


USGS 02352500 FLINT RIVER AT ALBANY, GA
Drainage Area: 5310 Square Miles, Length of Record: 97 Years

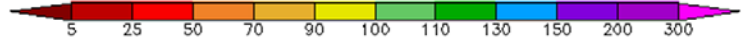
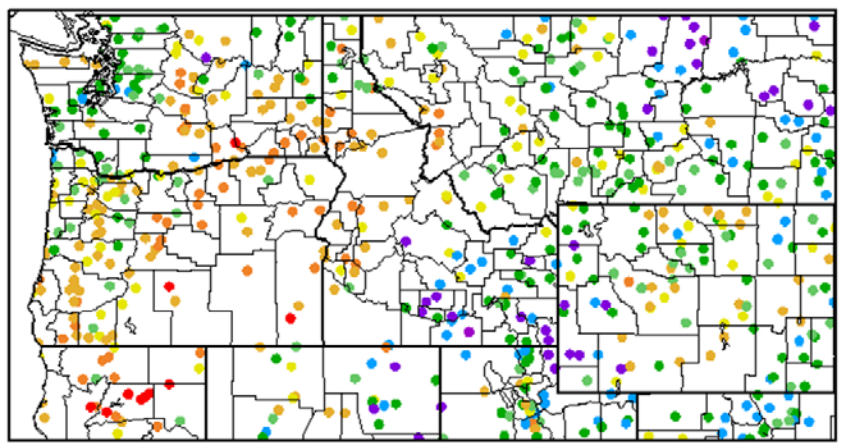


- 80
- 90
- 95
- 98

Ensemble-Mean - Current Top 1M 5
NCEP NLDAS Products

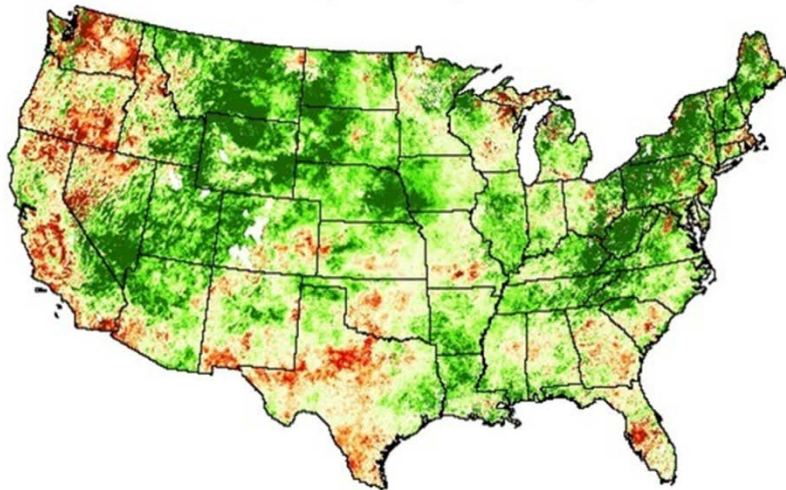


Percent of Normal Precipitation (%)
4/13/2014 - 10/12/2014

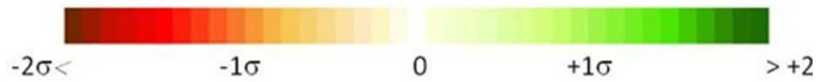


Evaporative Stress Index 4km

1 month composite ending October 08, 2014

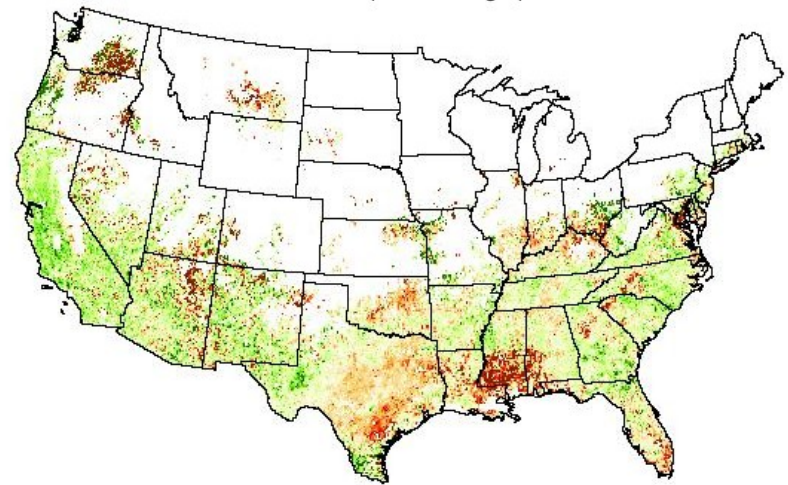


Standardized ET/PET anomalies

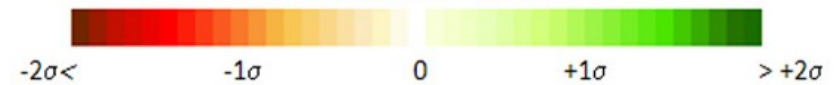


ESI Change

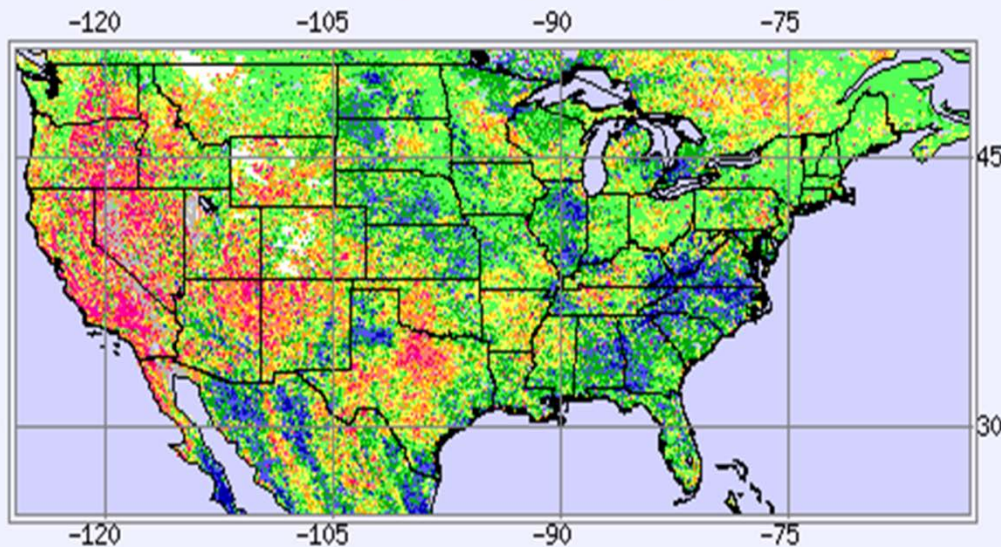
1 month composite ending April 9, 2013



Standardized ESI change anomalies

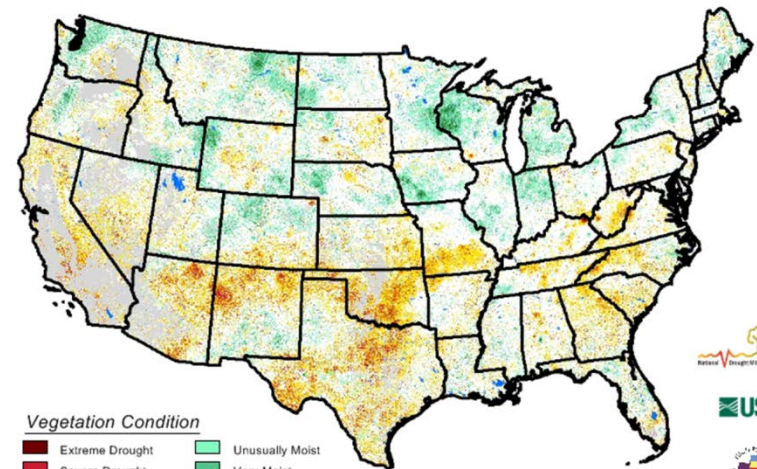


Oct. 7, 2014 (week 40)



Vegetation Drought Response Index Complete

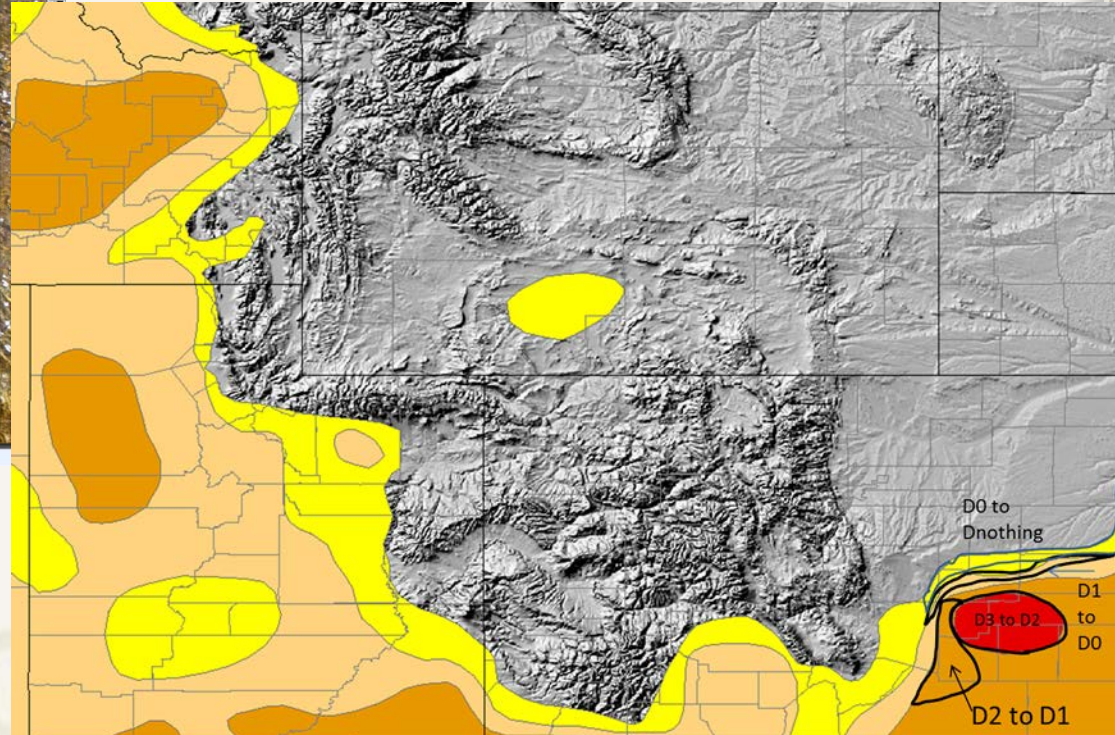
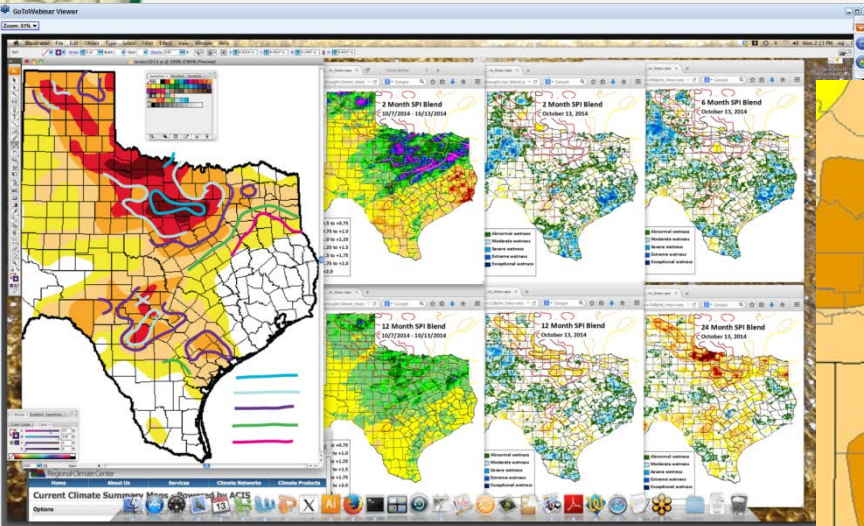
October 6, 2014



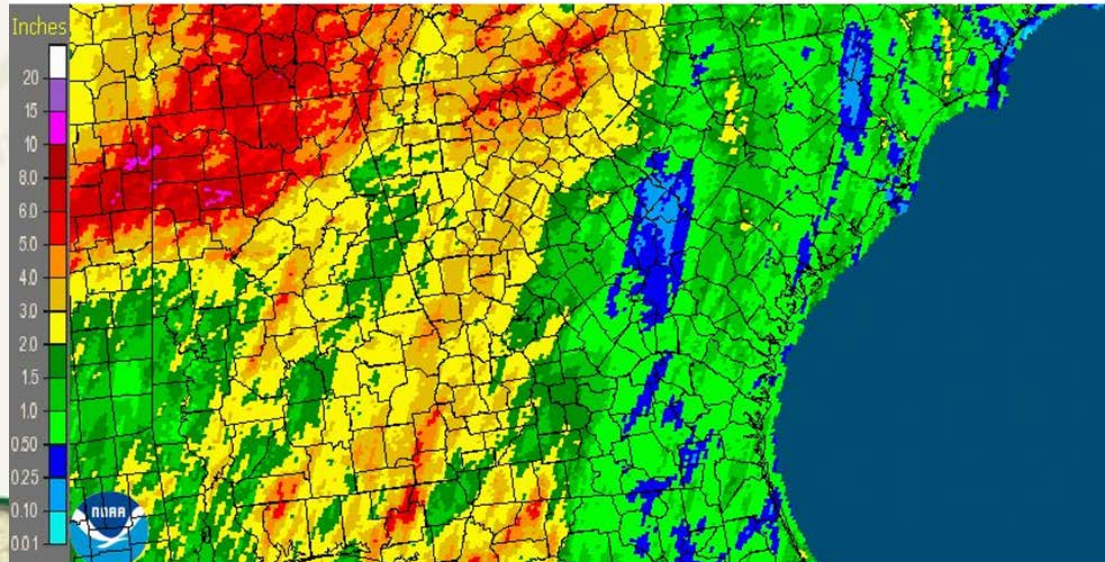
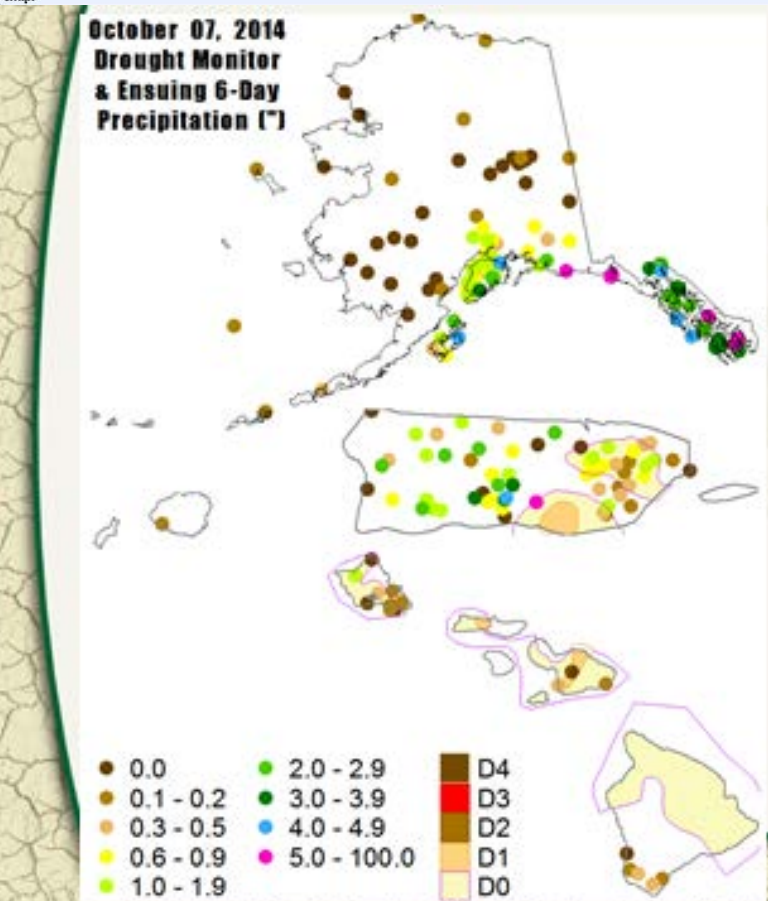
Vegetation Condition

- | | |
|------------------|-----------------|
| Extreme Drought | Unusually Moist |
| Severe Drought | Very Moist |
| Moderate Drought | Extremely Moist |
| Pre-Drought | Out of Season |
| Near Normal | Water |





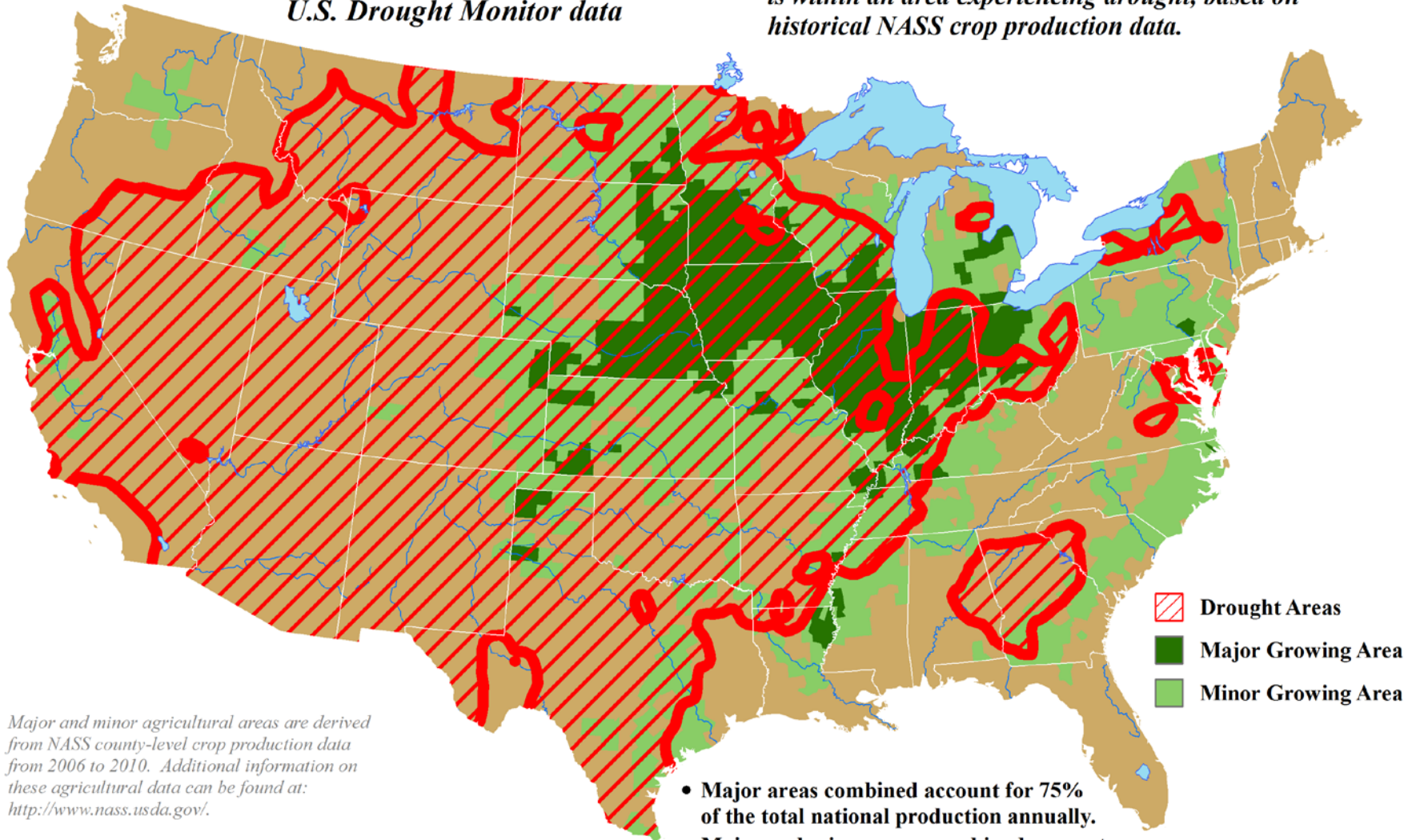
Georgia: Current 7-Day Observed Precipitation
Valid at 10/15/2014 1200 UTC- Created 10/15/14 14:17 UTC



U.S. Corn Areas Experiencing Drought

Reflects September 25, 2012
U.S. Drought Monitor data

Approximately 84% of the corn grown in the U.S.
is within an area experiencing drought, based on
historical NASS crop production data.



Major and minor agricultural areas are derived from NASS county-level crop production data from 2006 to 2010. Additional information on these agricultural data can be found at: <http://www.nass.usda.gov/>.

Mapped drought areas are derived from the U.S. Drought Monitor product and do not depict the intensity of drought in any particular location. More information on the Drought Monitor can be found at: <http://www.drought.unl.edu/dm/monitor.html>.

- Major areas combined account for 75% of the total national production annually.
- Major and minor areas combined account for 99% of the total national production annually.

Some Examples of Decision Making and Policy Using the USDM

(Science before Policy)

▸ *Policy:*

- 2008/2014 Farm Bill
 - USDA Farm Service Agency, Natural Resources Conservation Service, Risk Management Agency
- Internal Revenue Service
 - Livestock tax deferral program
- U.S. Department of Agriculture
 - Secretarial *"Fast Track"* Drought Designations
- NOAA National Weather Service
 - Drought Information Statements
- Environmental Protection Agency
 - Water quality monitoring
- Centers for Disease Control and Prevention
 - Public health
- Several States use in their monitoring/plans



Critical Elements of the USDM Process



- ▶ Started *simple* and built over time
- ▶ Collaboration: It's about the *Process!*
 - *Sharing* the data, products and credit
- ▶ *"Convergence of Evidence"*
- ▶ Communication
 - *Transparency and Trust*
- ▶ Involving *local experts*, data and feedback
 - Building an *ownership and validation* process
 - *"Value added"* knowledge taps into local expertise



Critical Elements of the USDM Process



- ▶ ***Impact*** collection is crucial
- ▶ ***Flexible*** and adaptable to new data/products as they come on-line
- ▶ Information ***dissemination***
 - ***“Derived products”*** are critical; raw data is shared, but “stays” with the creator/keeper of the data
 - ***Transparency***



Critical Observations:

- 1) ***No single*** indicator/index is used solely in determining appropriate actions
- 2) Instead, ***different*** thresholds from ***different*** combinations of inputs is the best way to approach monitoring and triggers using a variety of indices and indicators
- 3) Decision making (or ***"triggers"***) based on ***quantitative values*** are supported favorably and are better understood



Operating Schedule

National Drought Mitigation Center



Calendar for year 2013 (United States)

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	Fr	Sa
7						
14						
21						
28						

August						
Su	Mo	Tu	We	Th	Fr	Sa

September						
Su	Mo	Tu	We	Th	Fr	Sa

The authors usually takes 2-week turns, although cases arise where they do a 1-week or 3-week shift.

The reason: After two weeks, you are spent.

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

6						
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

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

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

Calendar for April 2013 (United States)

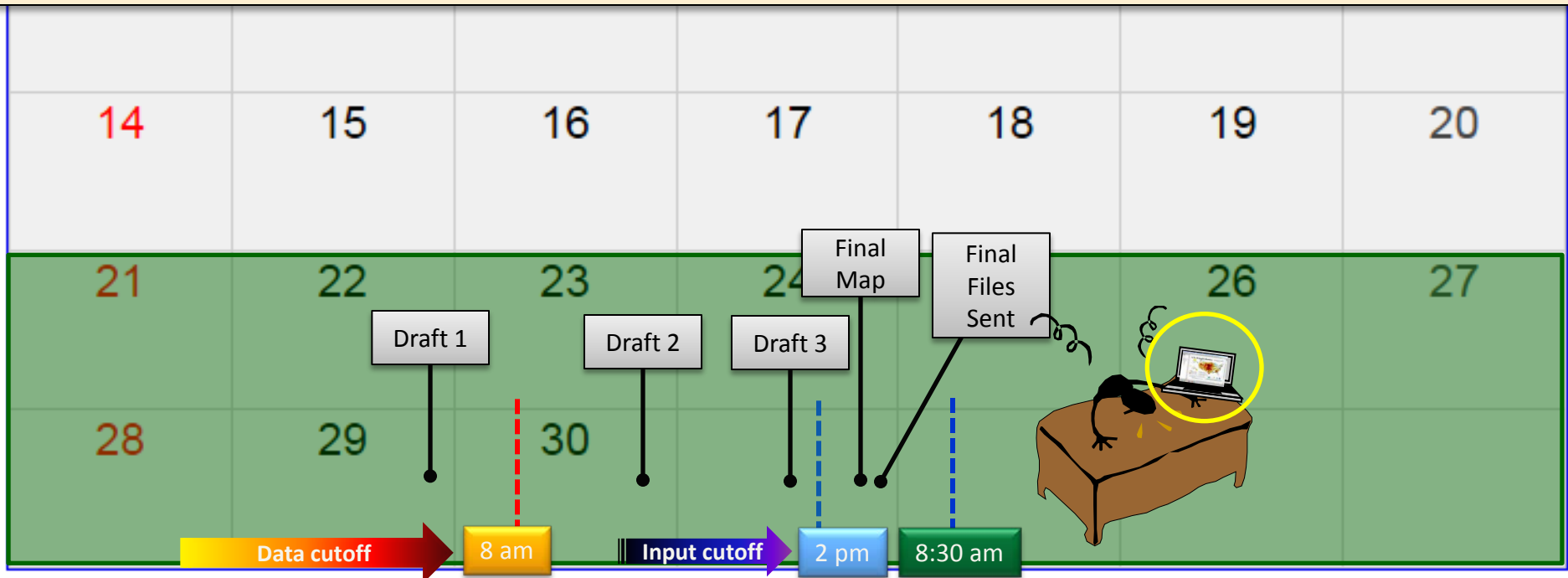
April						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
21	22	23	24	25	26	27
28	29	30				

The first and most important thing for the USDM community to know is the data “period”; *The data cutoff* – i.e. precipitation has to have fallen by this time to be included in the analysis – is **7 am EST, 8 am EDT, Tuesday morning**. This is done to (a) provide a consistent, week-to-week product and (b) provide the author a 24-hour window to assess the data and come up with a final map by Wed. evening.

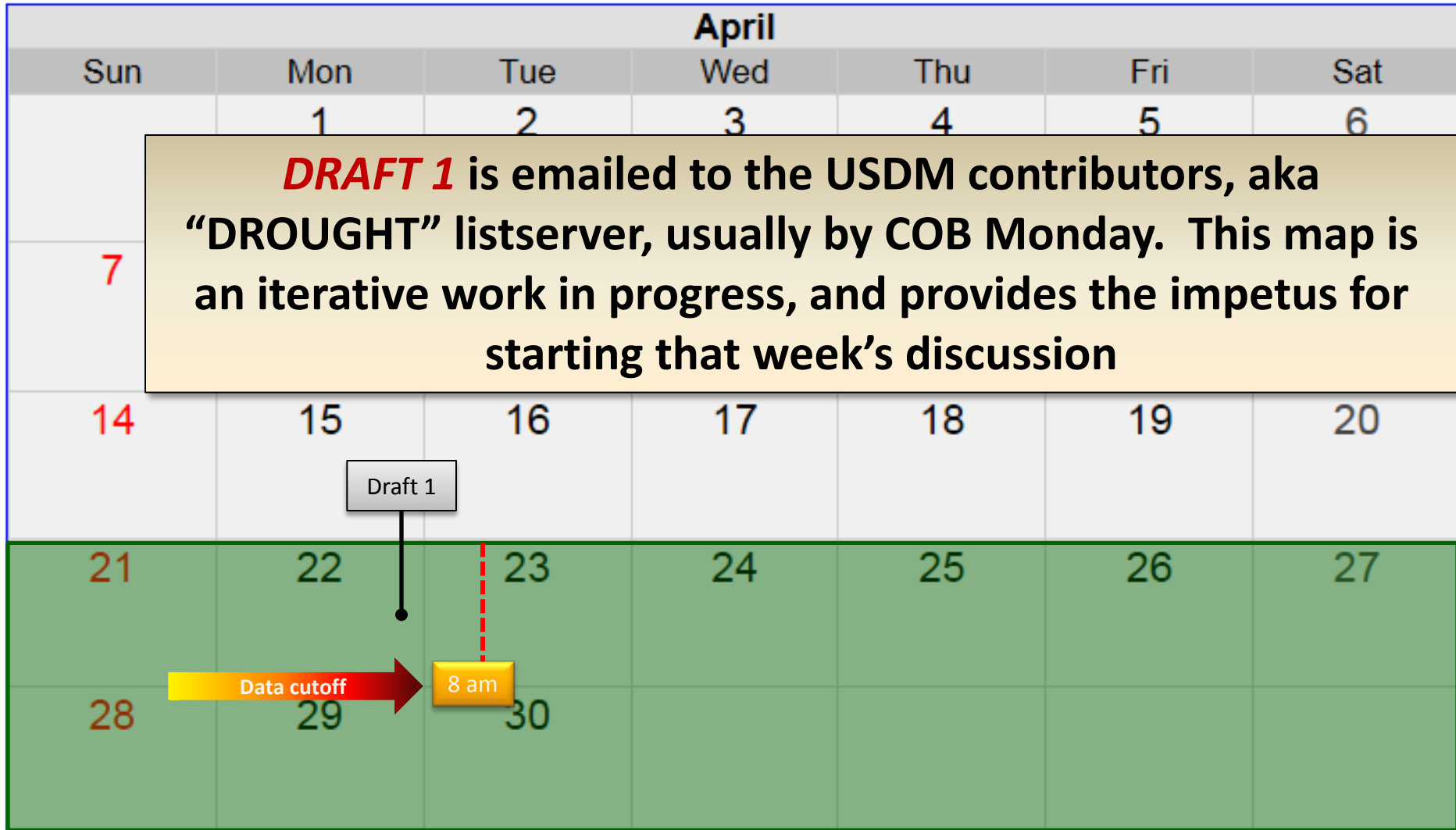
Calendar for April 2013 (United States)

April						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6

So just how does the USDM get edited/created every week?



Calendar for April 2013 (United States)



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.

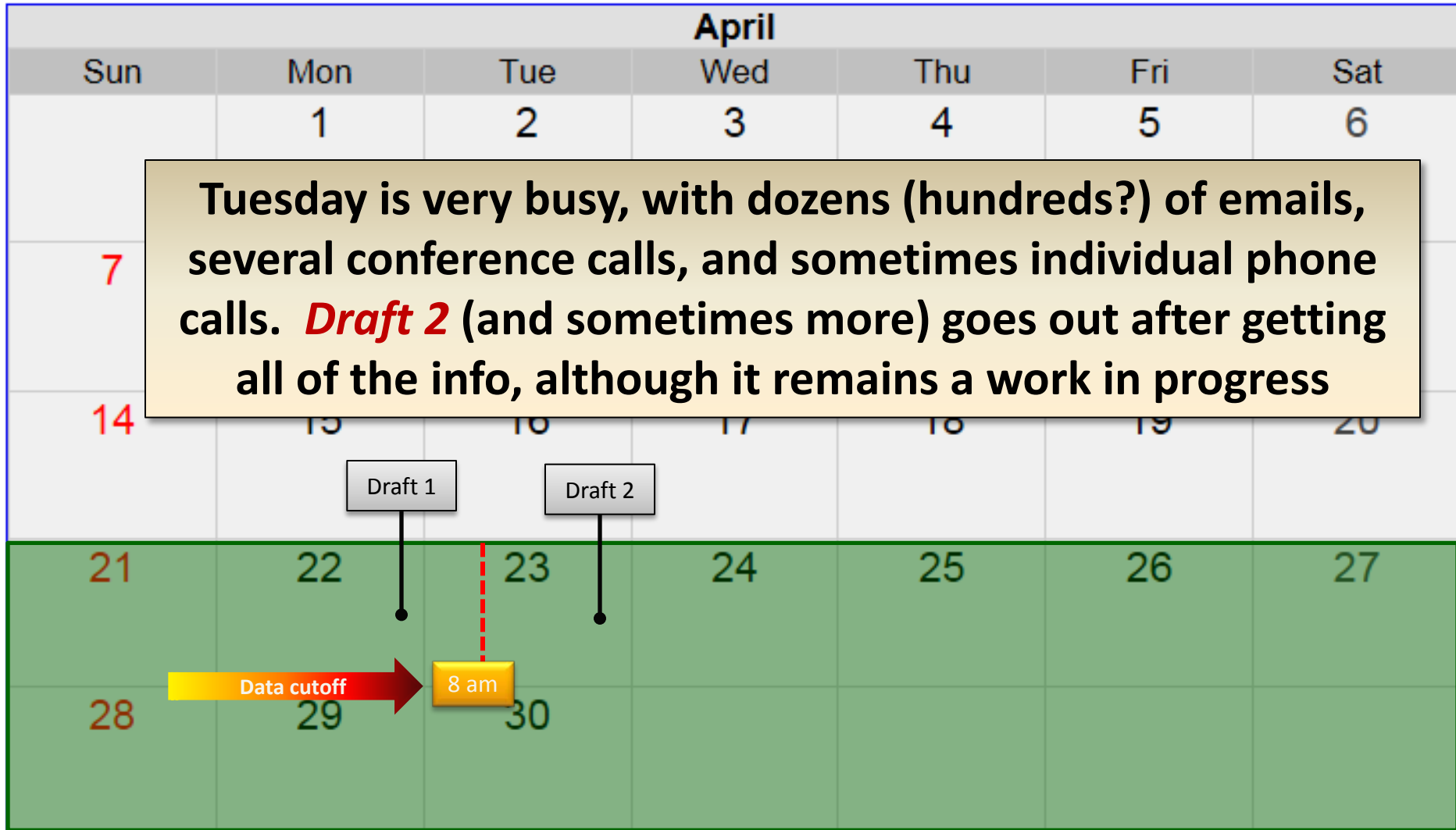
We project that October-November will rank somewhere between 2nd and 4th driest on record for Texas.

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, although we receive everything from highways to mountain ranges to river basins. In GIS, it's all very doable

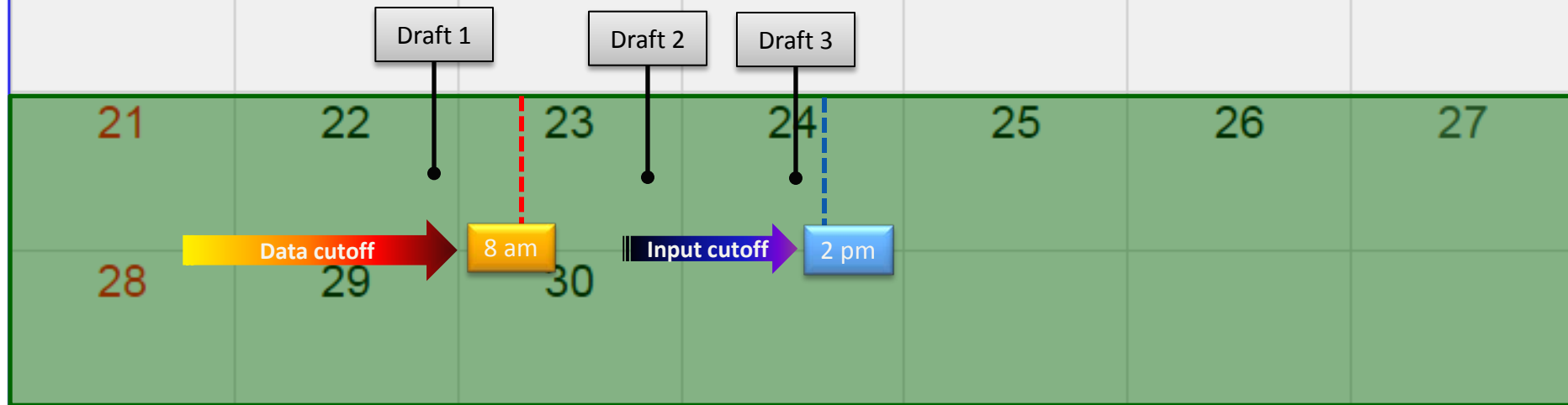
Calendar for April 2013 (United States)



Calendar for April 2013 (United States)

April						
Sun	Mon	Tue	Wed	Thu	Fri	Sat

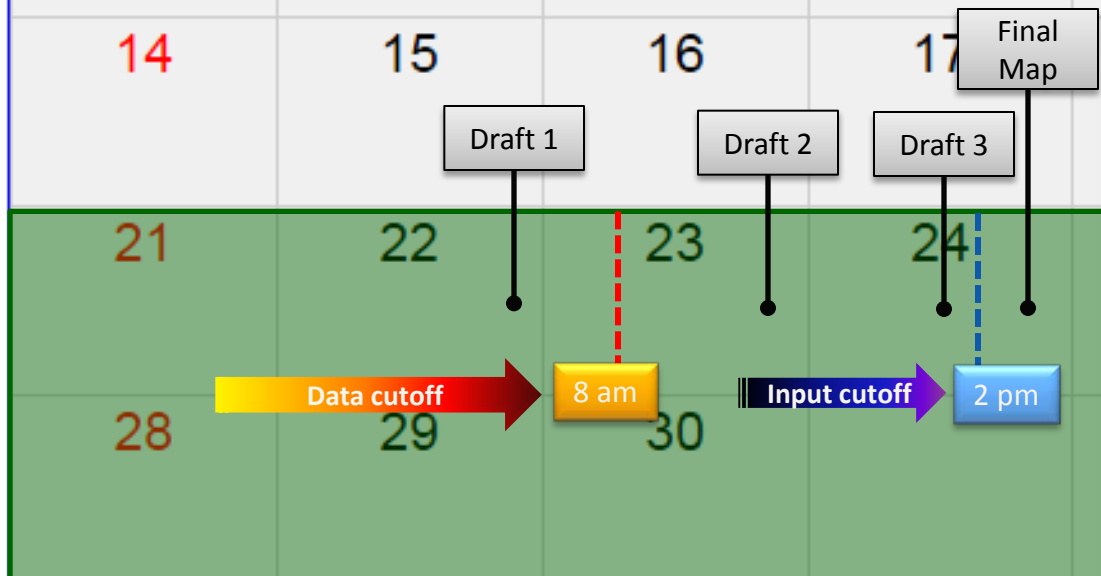
By Noon, EST Weds, we send out a near-final draft (**DRAFT 3**), and we close the door on changes to the map ~ 2 pm, EST. Sometimes late, key input will make the cut...and before we finalize, we send out any updates in subsequent drafts, but 2 pm is our “it’ll have to wait until next week” deadline



Calendar for April 2013 (United States)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
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A **FINAL** map is sent out ~3-4 pm to make sure there are no errors or other egregious mistakes. The author then composes a national narrative, broken down by regions, highlighting the past week's weather, impacts and USDM changes



National Drought Summary – March 19, 2013

The discussion in the Looking Ahead section is simply a description of what the official national guidance from the National Weather Service (NWS) National Centers for Environmental Prediction is depicting for current areas of dryness and drought. The NWS forecast products utilized include the HPC 5-day QPF and 5-day Mean Temperature prog, the 6-10 Day Outlooks of Temperature and Precipitation Probability, and the 8-14 Day Outlooks of Temperature and Precipitation Probability, valid as of late Wednesday afternoon of the USDM release week. The NWS forecast web page used for this section is: <http://www.cpc.ncep.noaa.gov/products/forecasts/>

Weather Summary: Over the course of the past week, the upper-air flow pattern featured a trough over the eastern contiguous U.S. and a ridge over the western U.S., followed by flattened east-west oriented flow, and ending with a developing trough over the Nation's midsection. Temperatures averaged several degrees below normal for the week across most of the Northeast and Florida, generally 4 to 8 degrees below normal across the Midwest, and near 15 degrees below normal in eastern North Dakota. Above normal temperatures prevailed from the southern Great Plains and Rockies westward to near the Pacific Coast. The largest positive departures were observed from central Nevada southeastward to western New Mexico, on the order of 10 to 14 degrees above normal. Several storm systems moved across the country during the period. Heavy precipitation (2 inches or more) fell across the northern Cascades and Olympic Peninsula of Washington, parts of the northern Rockies, southern Missouri and southern Illinois, the Ohio Valley, eastern Pennsylvania, and northern New Jersey. Light precipitation (less than 0.5-inch) was observed over California, the Southwest, the interior Pacific Northwest, most of the Great Plains, Louisiana, parts of the Corn Belt and Great Lakes, and much of Florida. Most other areas of the contiguous U.S. reported moderate precipitation (between 0.5 and 2 inches) during the past 7 days.

The Northeast and Mid-Atlantic: Widespread light to moderate precipitation (under 2 inches) amounts were noted over the region during the past 7-days. Eastern Pennsylvania and parts of northern New Jersey reported heavy precipitation (2-3 inches). Weekly temperatures averaged 2-4 degrees below average for most of this region, limiting evapotranspiration. With green-up still several weeks away for areas of higher terrain, it was decided not to modify the regional drought depiction this week.

The Southeast: Moderate rains (0.5 - 2 inches) fell across the Tennessee Valley, Georgia, much of the Carolinas, southeastern and far northern Alabama, and in very isolated locations across Florida. A 1-category improvement was made across extreme southwestern-, west-central-, and extreme east-central Georgia due to the recent rainfall, and Percent of Normal Precipitation (PNP) values ranging from 110-150 percent of normal over the past 3 months (Advanced Hydrologic Prediction System, AHPS). In contrast, there was expansion of abnormal dryness (D0) over southeastern North Carolina and extreme southern Alabama, based on increasing rainfall deficits and fairly low stream flows.

For the Florida peninsula, rainfall departures (Departure from Normal Precipitation – DNP) from AHPS for the past 90-days generally ranged from 4-6 inches (locally greater). The area of moderate drought (D1) in southern Florida was expanded northward to include eastern portions of both Miami-Dade and Broward counties.

The Midwest: Light precipitation (less than 1 inch) was noted over much of this region. A 1-category improvement (from D1 to D0) was made over northern Illinois to be consistent with surrounding areas that had approximately the same weather and soil conditions. In southern Wisconsin, a 1-category upgrade was made, warranted by DNPs (from 14-days to 180-days) in significant surplus, rivers running high with some minor flooding reported, and a wet, snowy winter overall. The remaining areas of the Midwest were left unchanged in the drought depiction, due to the continuing presence of frozen ground. Davenport, IA reported a frozen soil depth of 5 inches, with very slow thawing occurring.

Lower Mississippi Valley/Delta region: Significant precipitation deficits (AHPS PNP values of 25-75 percent of normal rainfall during the past 2 months) justified an eastward expansion of D0 conditions along and near the border between Arkansas and Louisiana. Stream flows in this region are down in the lowest 10 percent of the historical distribution. In addition, a one-category degradation was also made to extreme southwestern counties in Arkansas.

Calendar for April 2013 (United States)

April

Sun

Mon

Tue

Wed

Thu

Fri

Sat

By 6 pm EST on Wed., all the files are compressed and sent to several different groups, most importantly the Drought Mitigation Center, who then confirms receipt before the author is free to go

14

15

16

17

19

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Draft 1

Draft 2

Draft 3

Final Map

Final Files Sent

21

22

23

24

25

26

27

Data cutoff

8 am

Input cutoff

2 pm

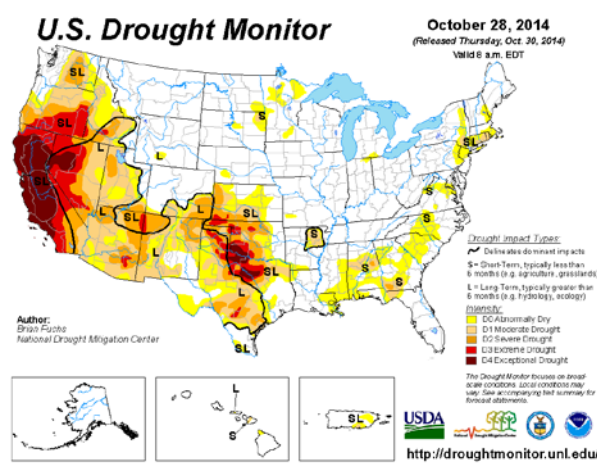
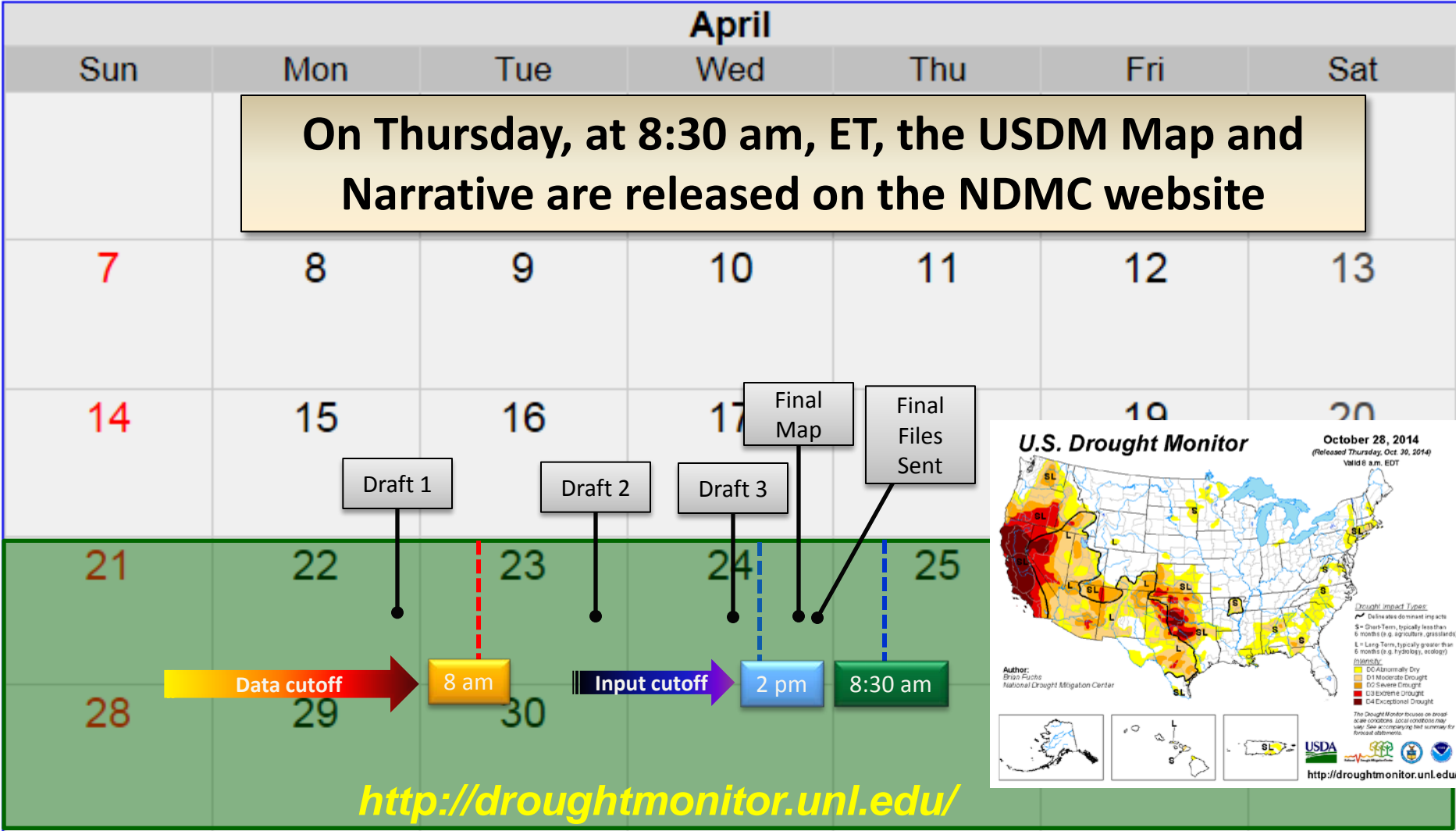
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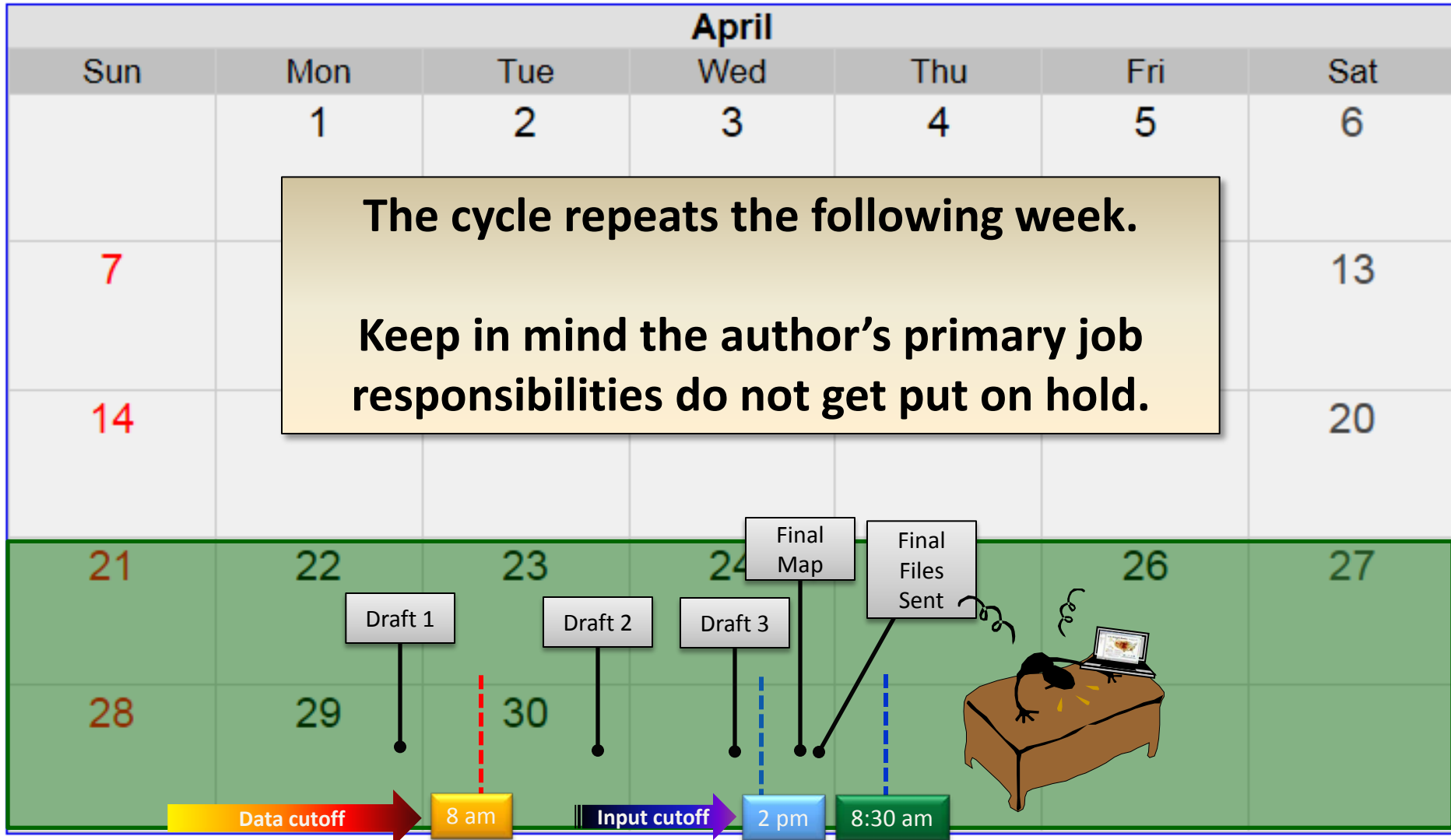
30

Calendar for April 2013 (United States)

On Thursday, at 8:30 am, ET, the USDM Map and Narrative are released on the NDMC website



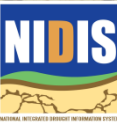
Calendar for April 2013 (United States)



Next Steps



- ▶ Continue ***interactions*** with local drought task forces, State Climate Offices, WFOs/RFCs, Regional Climate Centers
 - Foster new basin/state interactions
 - NIDIS RDEWS basin briefings...more coming
 - ▶ S.Plains/California/MO Basin/Carolinas/Chesapeake, Columbia, others??
- ▶ Continue to encourage and incorporate ***new/enhanced/innovative products via GIS:***
 - ACIS gridded SPI-SPEI/sc-PDSI
 - Gridded Objective Indice Blends
 - AHPS Precipitation from National Weather Service
 - Augment with remote sensing products (ESI, ET)
 - NLDAS, Composite Drought Indices, Soil Moisture



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