

Drought Monitoring and Forecasting at CPC

Matthew Rosencrans



Introduction



- CPC addresses two parts of drought
 - Monitoring – What happened/happening now?
 - USDM
 - NADM
 - Forecasting – What's going to happen?
 - USDO – Seasonal Drought Outlook

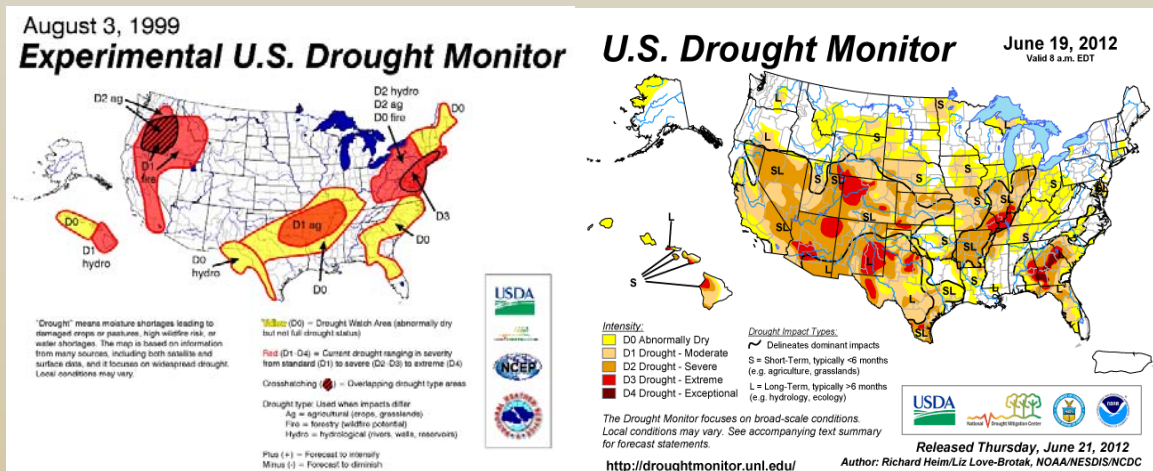


The U.S. Drought Monitor



Since 1999, *NOAA, USDA, and the NDMC* have produced a weekly composite drought map -- the U.S. Drought Monitor -- Input from numerous federal and non-federal agencies

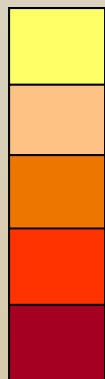
- **Western Region Climate Center** on board 2008
- **11** authors in all
- **Incorporate** information and products from all entities (and levels of government) dealing with drought (RCC's, SC's, Fed/State agencies, etc.) (**~350 experts**)





Objectives

- ▶ **Categorical** scale (like for Tornados or Hurricanes)
- ▶ **NOT** a forecast, **NOR** drought declaration
- ▶ Identify **impact timelines** (S, L)
- ▶ Assessment of **current** conditions
- ▶ Incorporate **local expert** input
- ▶ Be as **objective** as possible



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



U.S. Drought Monitor



Integrates Key Drought Indicators:

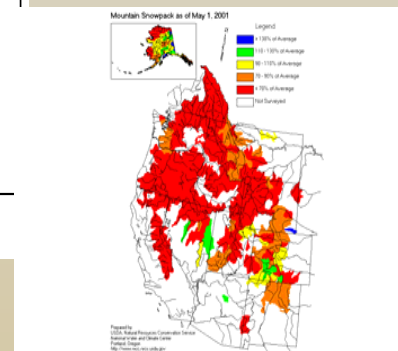
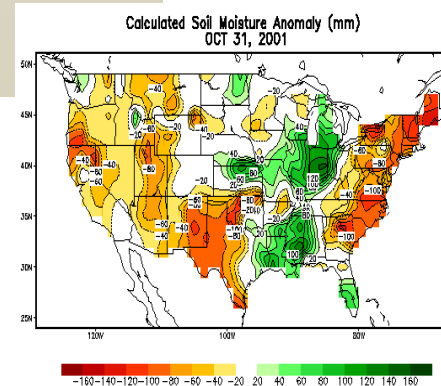
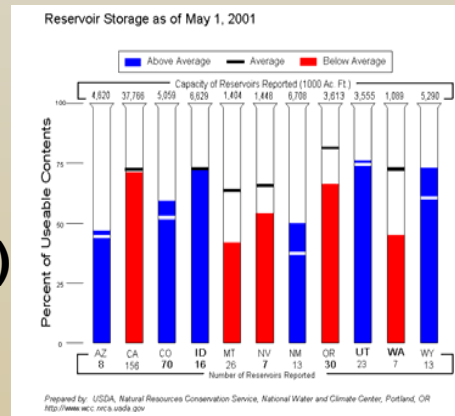
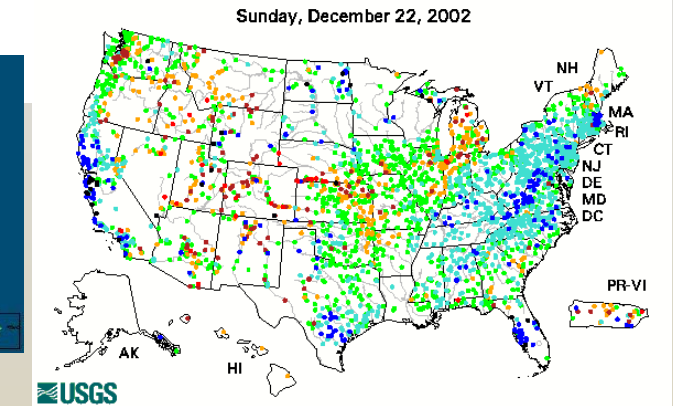
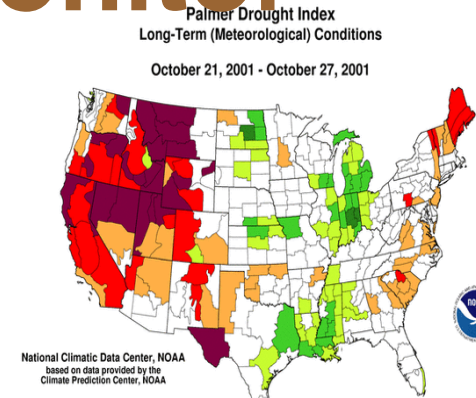
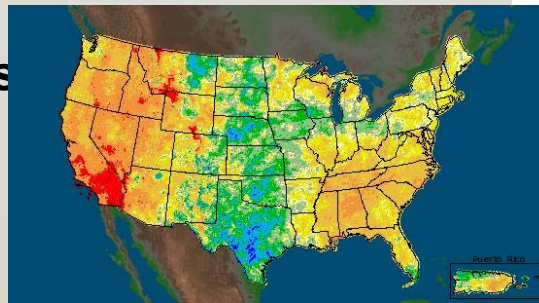
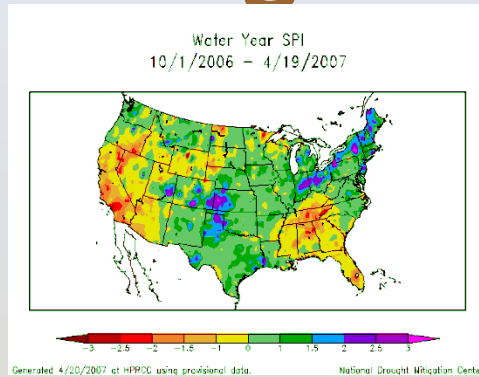
- Palmer Drought Index
- SPI
- KBDI
- Modeled Soil Moisture
- Streamflow
- Precipitation Anomalies

Growing Season:

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

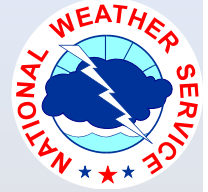
In The West:

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





Local Expert Input



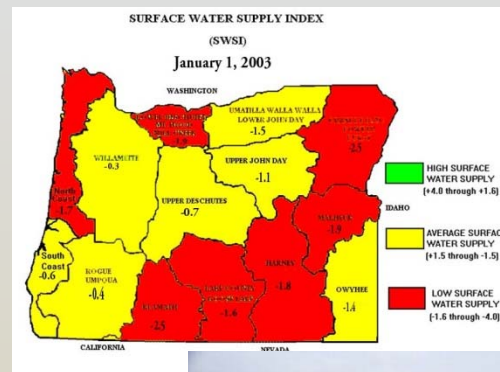
- The U.S. Drought Monitor Team Relies on Field Observation Feedback from the Local Experts for Impacts Information & “Ground Truth”
 - Listserver (~350 Participants: 2/3 Federal, 1/3 State/Univ.)

Local NWS &
USDA/NRCS
Offices

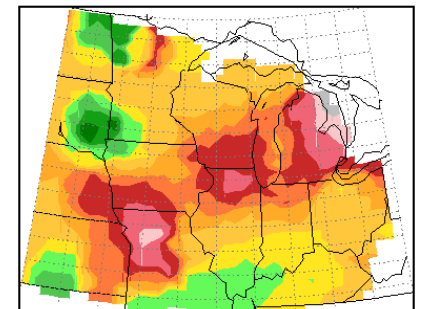
State Climate
Offices

State Drought
Task Forces

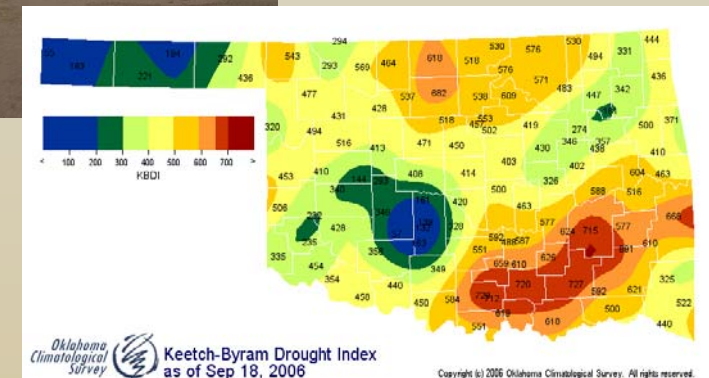
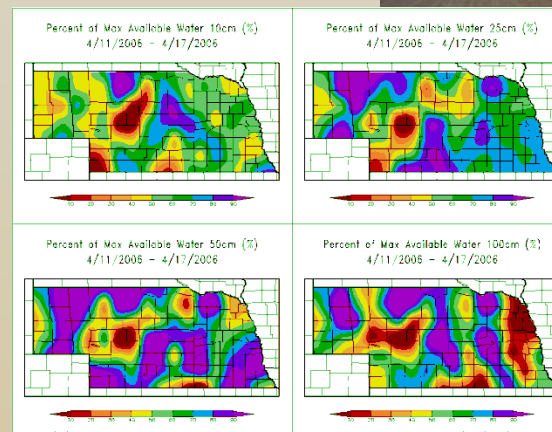
Regional
Climate
Centers



Current Soil Moisture Deviation (%), Depth = 0–72
March–23–2003



Midwestern Regional Climate Center
Illinois State Water Survey
Champaign, Illinois



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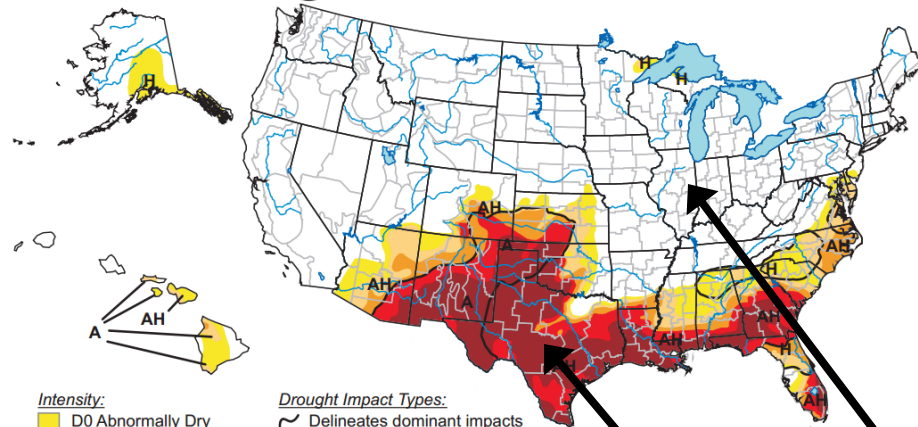


Changes - Last Week/Year



U.S. Drought Monitor

June 21, 2011
Valid 8 a.m. EDT



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

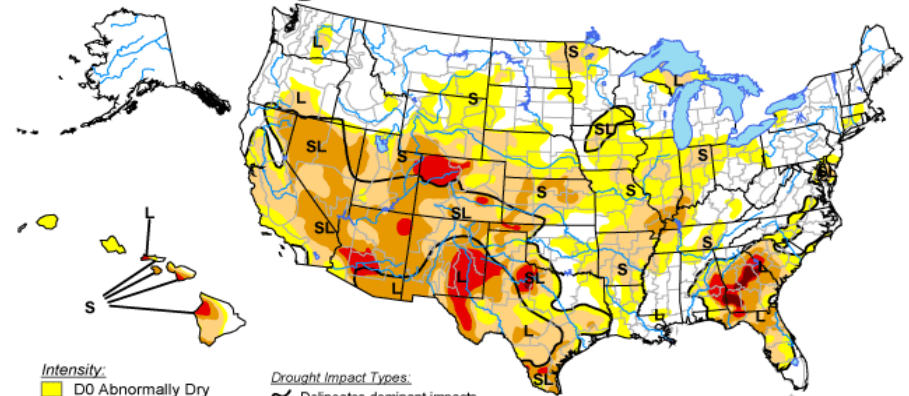
Drought Impact Types:
~ Delineates dominant impacts
A = Agricultural (crops, pastures, grasslands)
H = Hydrological (water)

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



U.S. Drought Monitor

June 12, 2012
Valid 7 a.m. EDT



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)

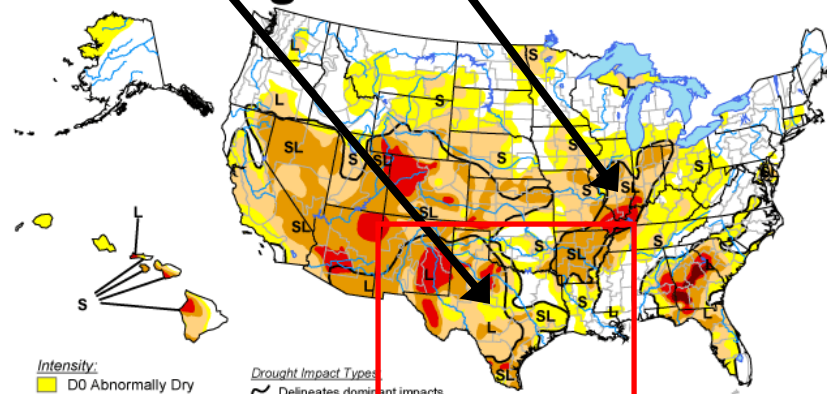
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



Released Thursday, June 14, 2012
Author: David Miskus, NOAA/NWS/NCEP/CPC

U.S. Drought Monitor

June 19, 2012
Valid 8 a.m. EDT



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.



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

Released Thursday, June 21, 2012
Author: Richard Heim/Liz Love-Brotak, NOAA/NESDIS/NCDC



U.S. Seasonal Drought Outlook



Since March 2000, **NOAA – CPC** has produced a monthly **U.S. Seasonal Drought Outlook**

- Combines current USDM areas (D1 and greater) with forecast information

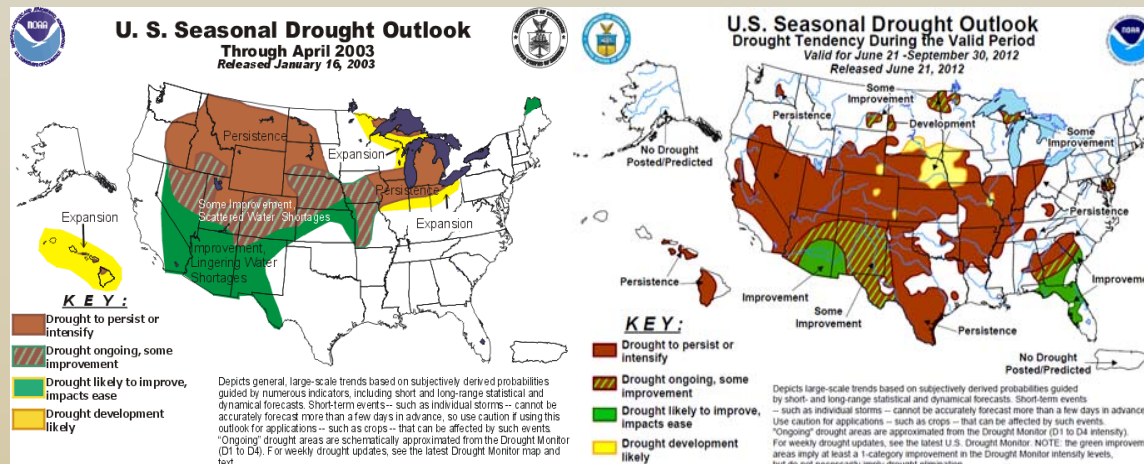
- **Models**
- **CPC Seasonal Forecasts**
- **Analog**s

• **Trends**

•

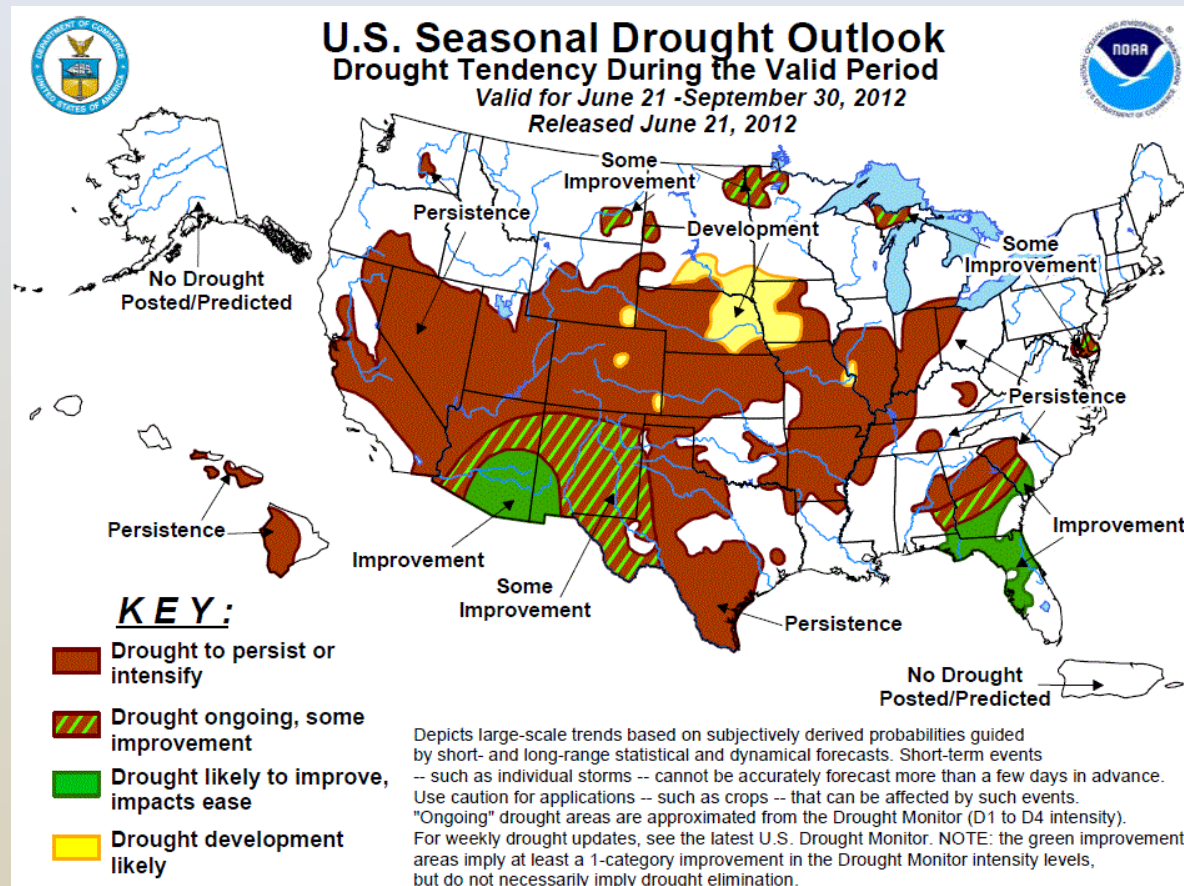
• **Climatology**

Issued - First and the third Thursday of the month.





U.S. Seasonal Drought Outlook



Indicates continued dryness across Central Plains leading to expanding drought, and either persistence or intensifying drought in brown areas.

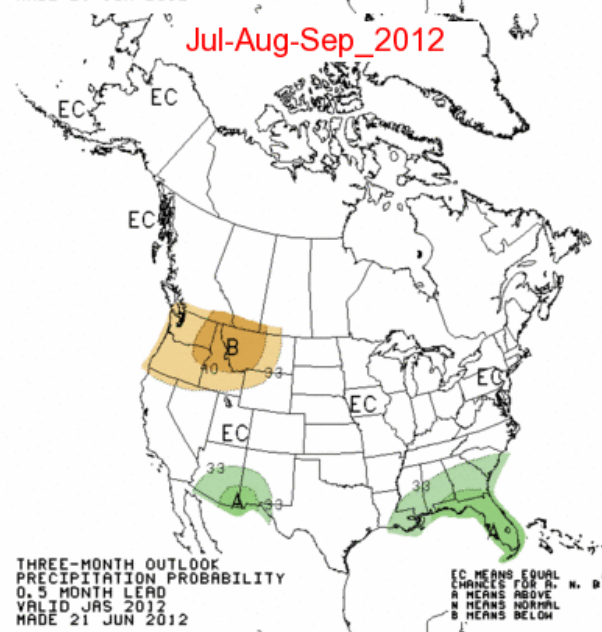
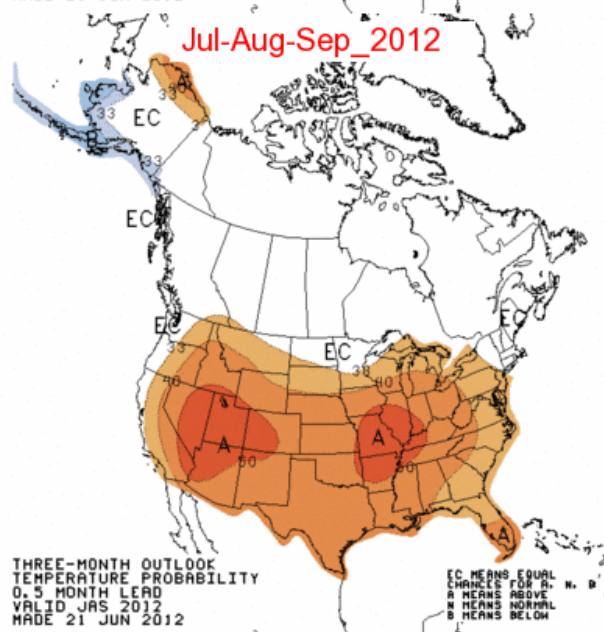
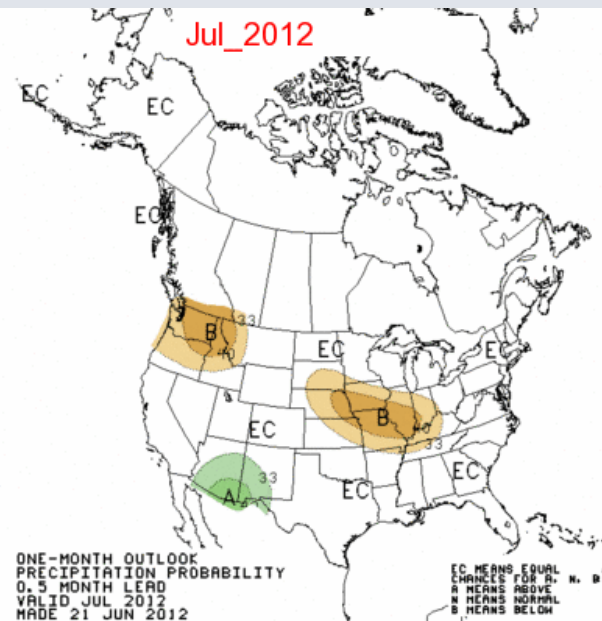
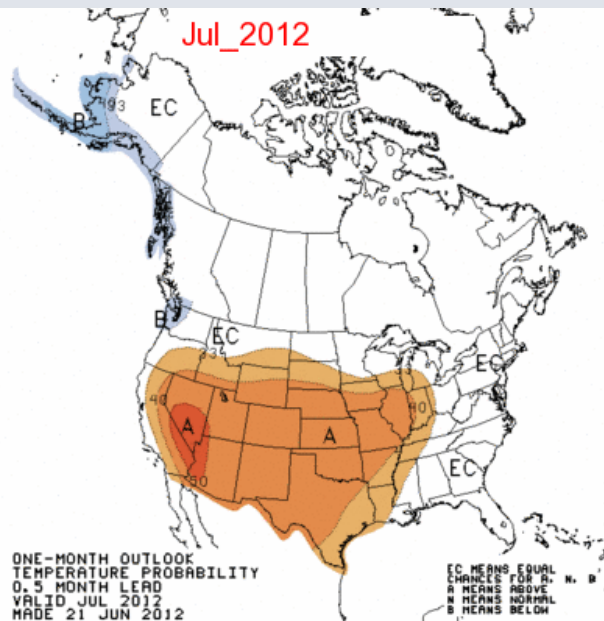
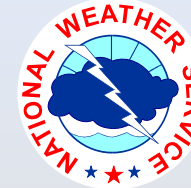
Monsoon forecast to bring some relief.

Southeast US is generally wet during the summer.

Northern storm track should help things Montana → Great Lakes.



Monthly/Seasonal Outlooks

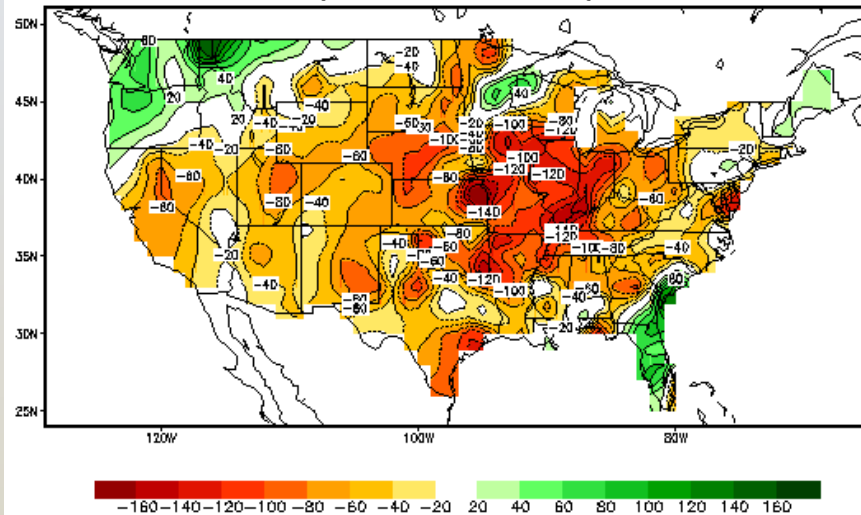




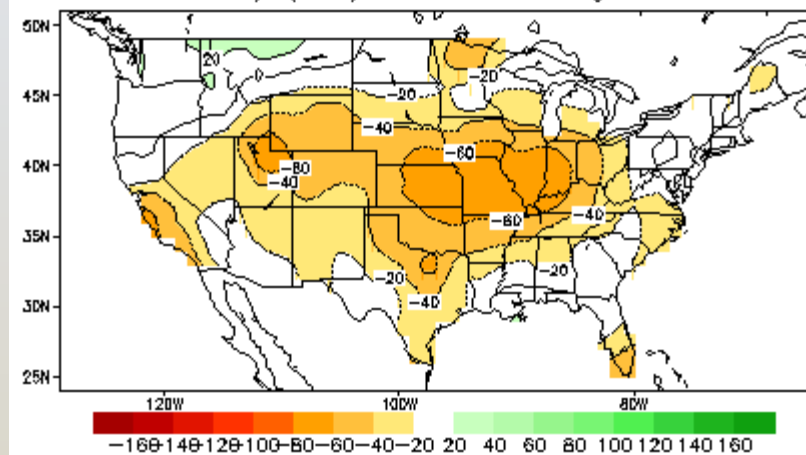
Soil Moisture Tools



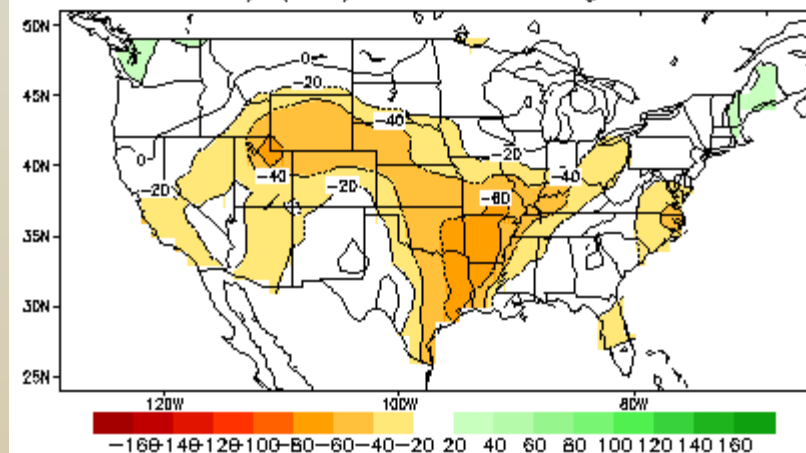
Predicted Soil Moisture Anomaly (mm)
(09Jul2012–19Jun2012)



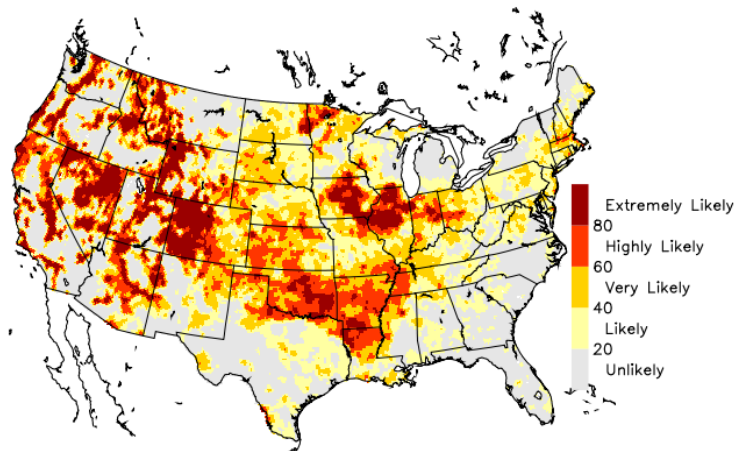
Lagged Averaged Soil Moisture Outlook for End of JUL2012
units: anomaly (mm), SM data ending at 20120625

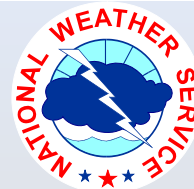


Lagged Averaged Soil Moisture Outlook for End of SEP2012
units: anomaly (mm), SM data ending at 20120625

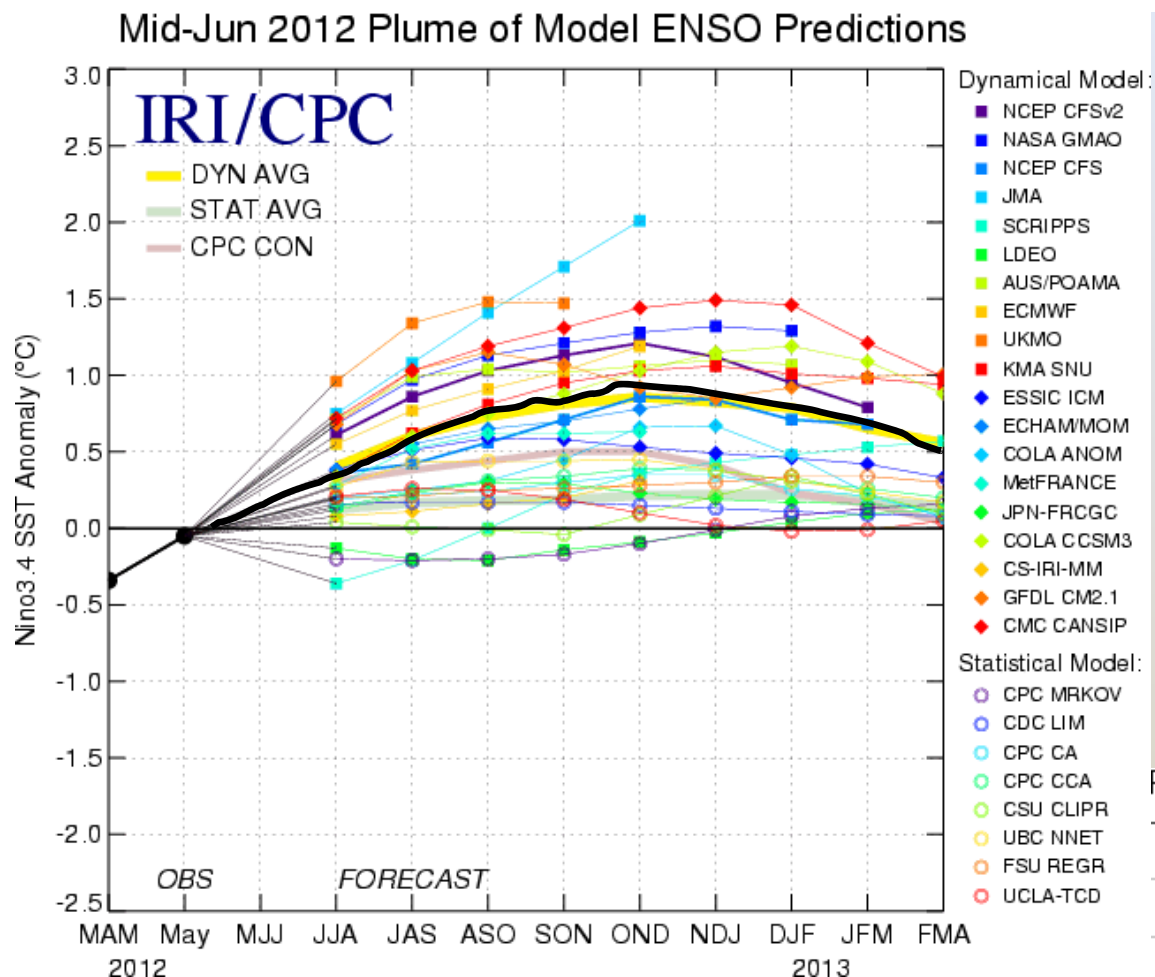


Experimental Drought Forecast based on CFS Forecast
Probability of Total Soil Moisture below 20th Percentile (Most Likely 7 Members)
JUL2012 (Init: 20120601)





EL Nino-Southern Oscillation (ENSO)



Plume-Based Probabilistic ENSO Forecast

ENSO state based on NINO3.4 SST Anomaly

Neutral ENSO: -0.45°C to 0.45°C

El Niño

Neutral

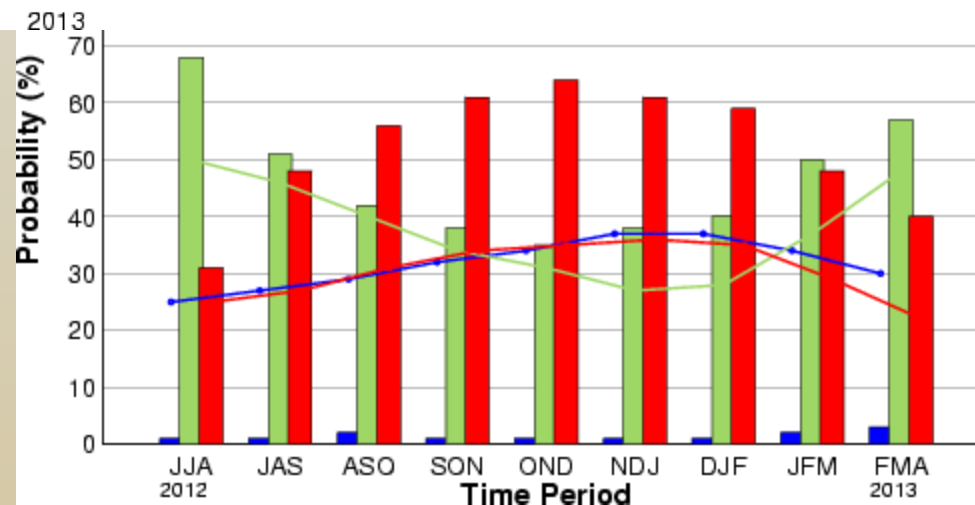
La Niña

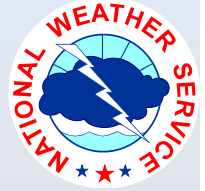
Climatological Probability:

El Niño

Neutral

La Niña





Useful links

- www.cpc.ncep.noaa.gov/products/Drought/
- www.drought.gov
- www.droughtmonitor.unl.edu
- <http://www.ncdc.noaa.gov/temp-and-precip/drought/nadm/index.html>