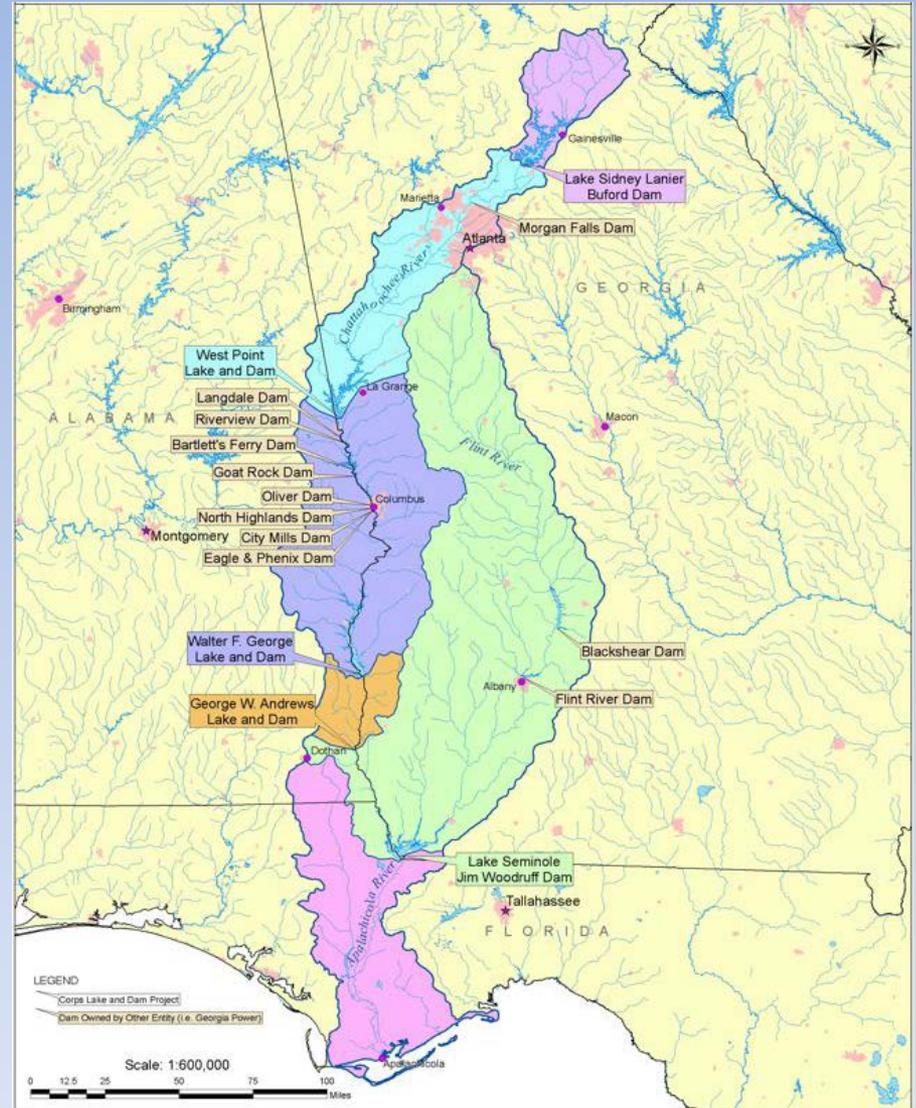
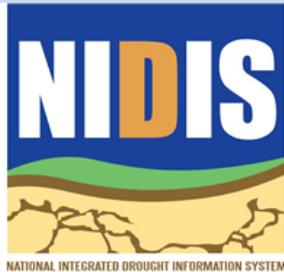


National Integrated Drought Information System

Drought Early Warning for the Apalachicola-Chattahoochee-Flint River Basin

12 July 2016

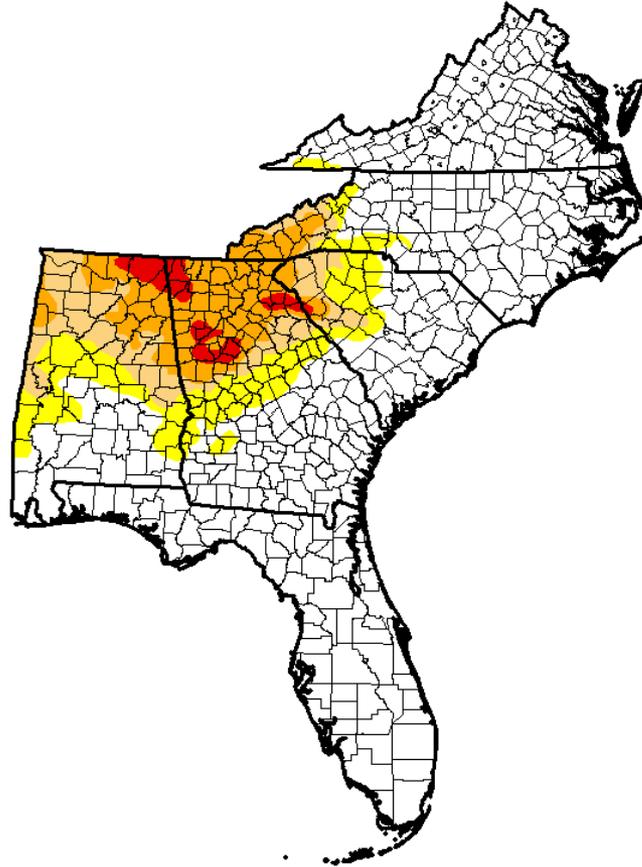


Outline

Welcome – Eric Reutebuch, AU Water Resources Center

- Current drought status, seasonal forecasts and outlooks – David Zierden, Florida Climate Center, FSU
- Streamflows and groundwater – Paul Ankorn, USGS
- Streamflow forecasts – Todd Hamill, SERFC
- ACF reservoir conditions – Cynthia Donald, Water Management Section, United States Army Corps of Engineers
- Alabama Drought Declaration – Tom Littlepage, OWR-ADECA
- GriDSSATW - Lee Ellenburg, ESSC-UAH
- Summary and Discussion

Current drought status



Intensity:

-  D0 - Abnormally Dry
-  D1 - Moderate Drought
-  D2 - Severe Drought

-  D3 - Extreme Drought
-  D4 - Exceptional Drought

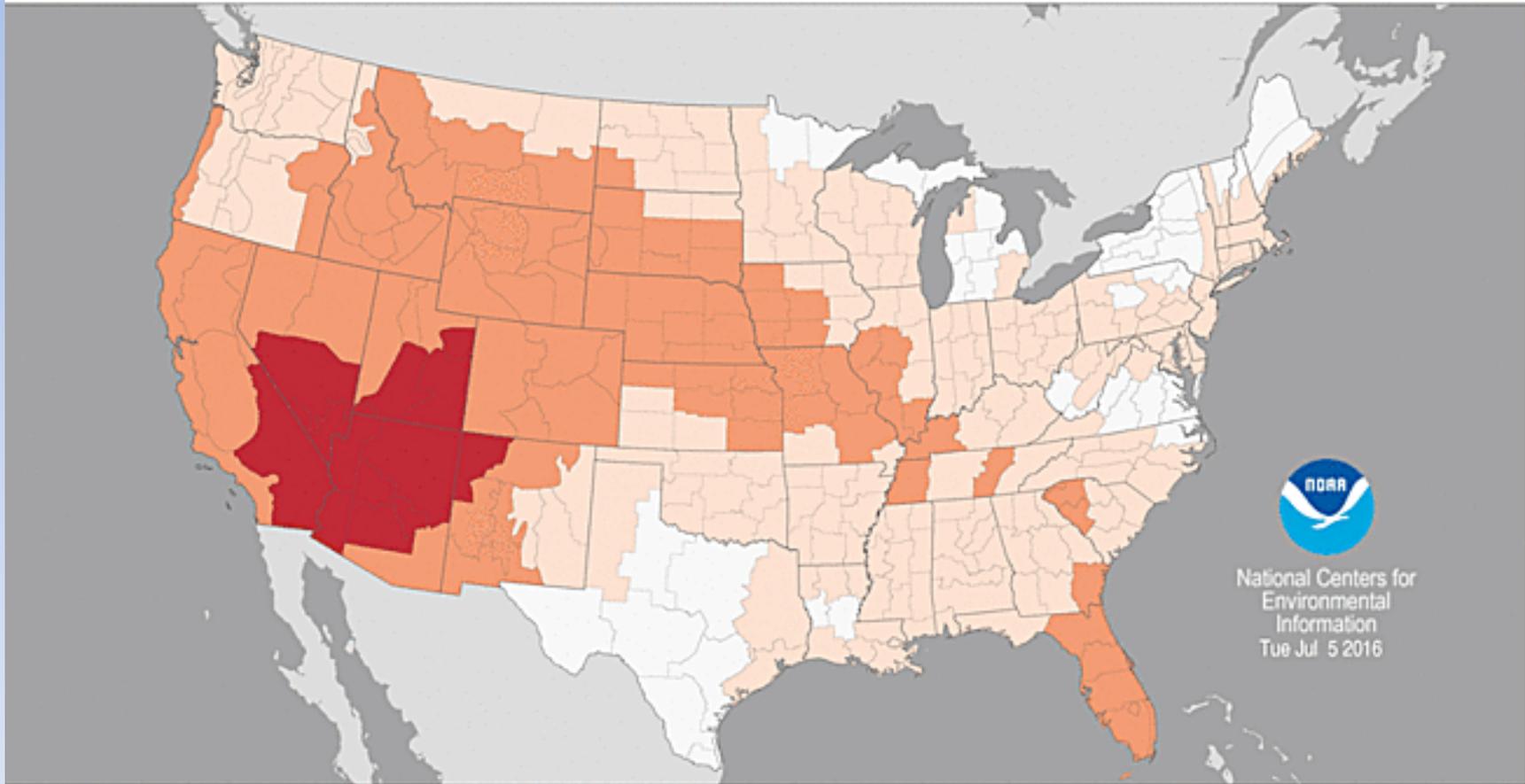
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying [text summary](#) for forecast statements.

Hottest U.S. June on Record

Divisional Average Temperature Ranks

June 2016

Period: 1895-2016



National Centers for
Environmental
Information
Tue Jul 5 2016

Record
Coldest

Much
Below
Average

Below
Average

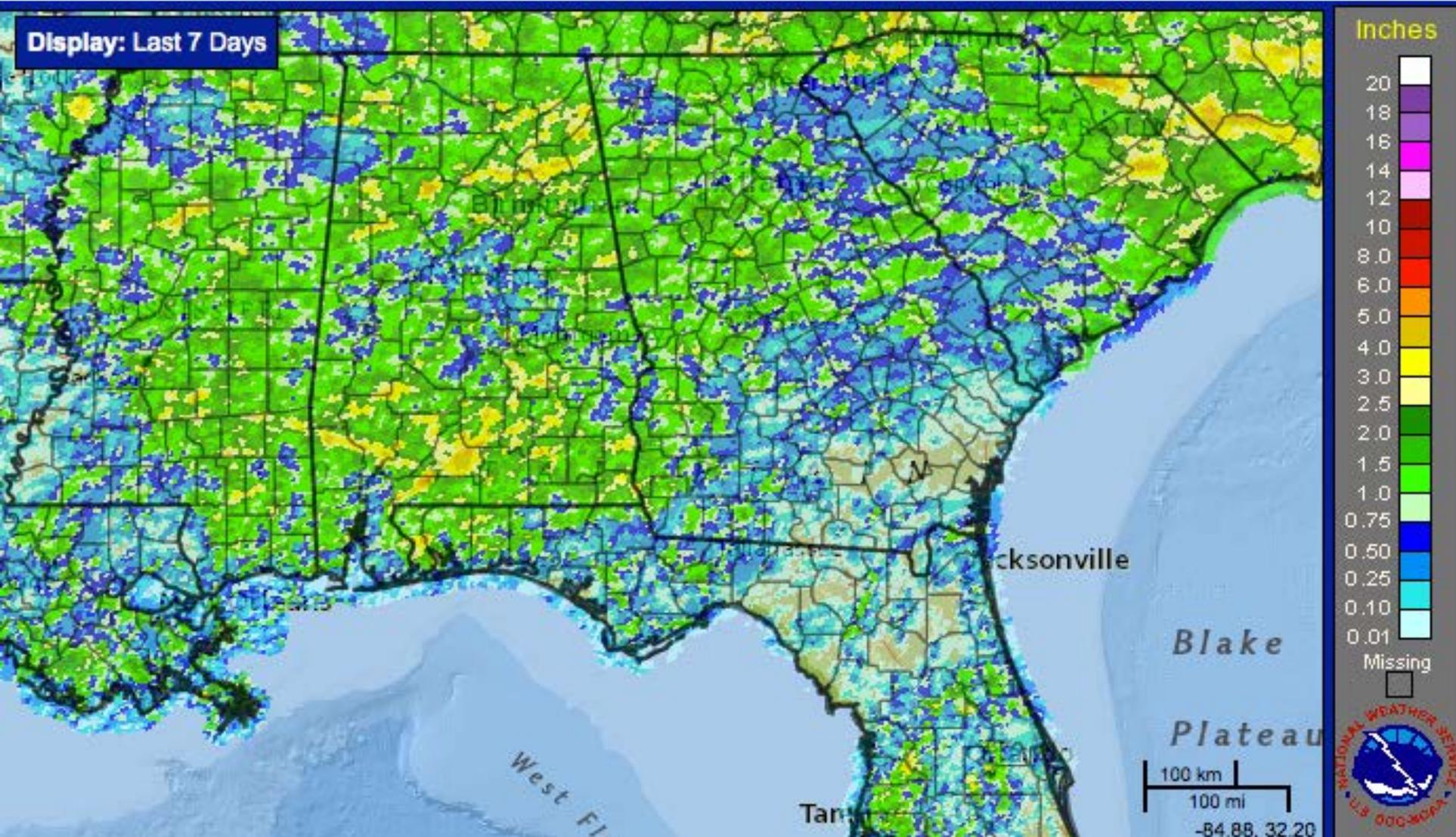
Near
Average

Above
Average

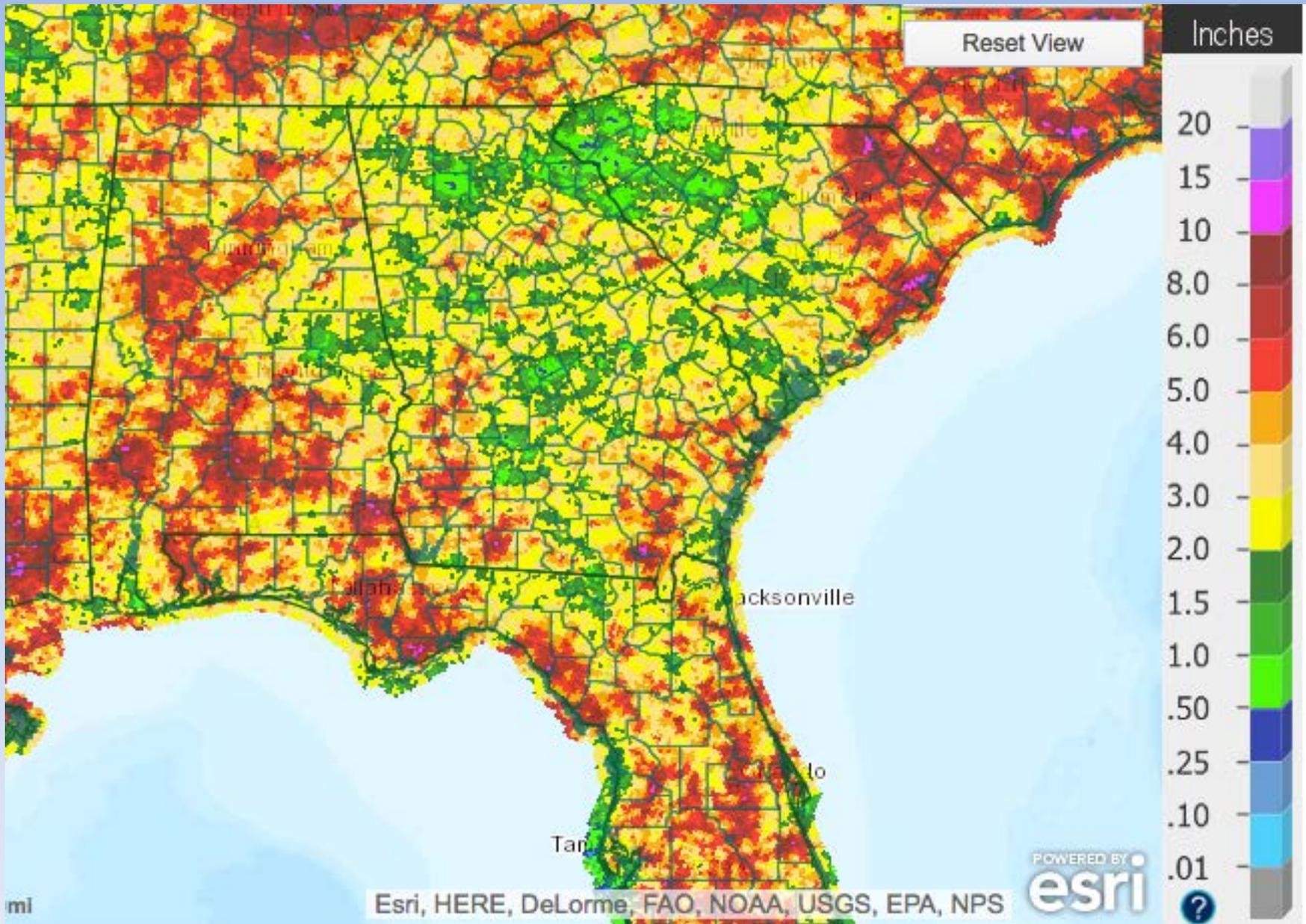
Much
Above
Average

Record
Warmest

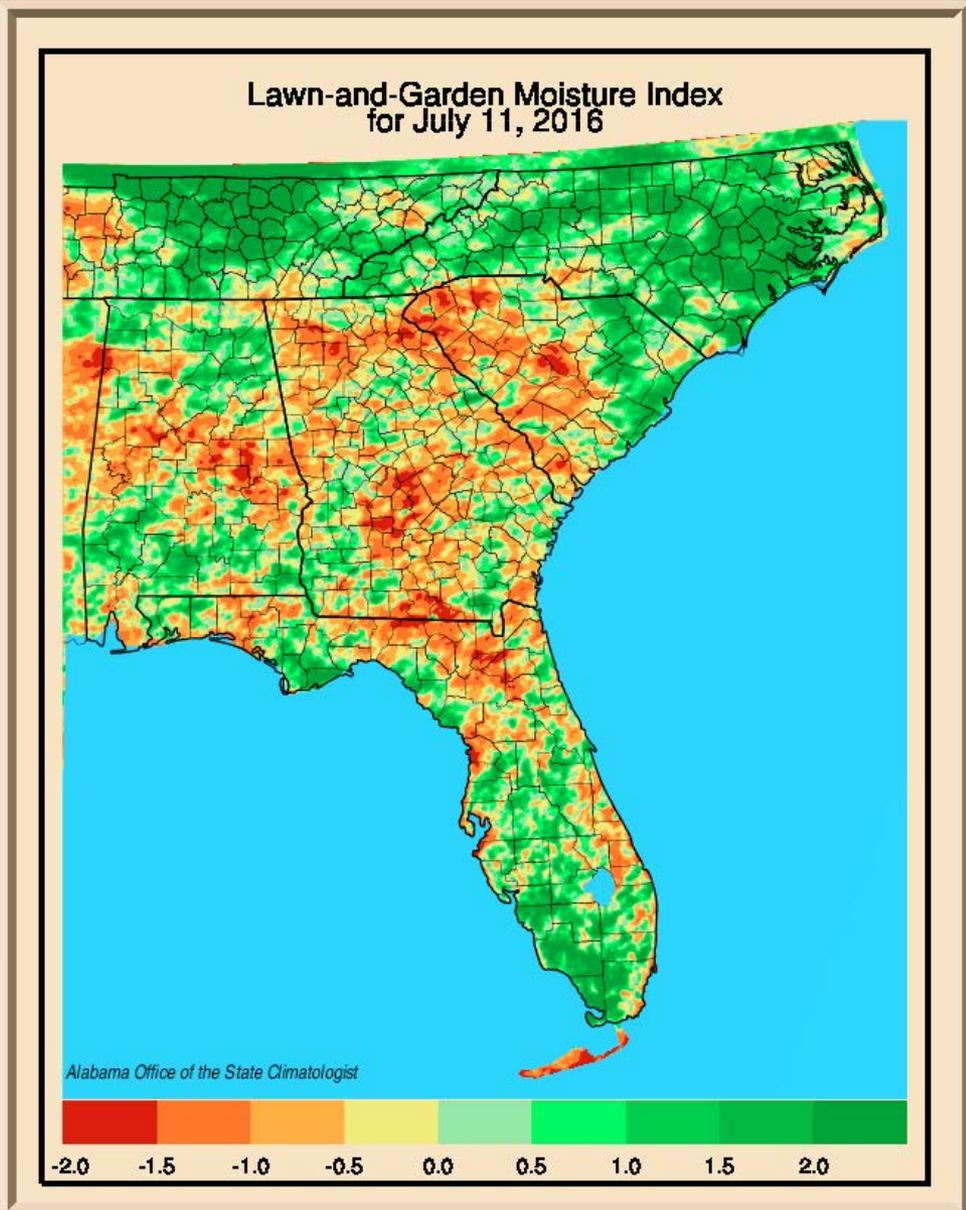
Rainfall – Last 7 Days



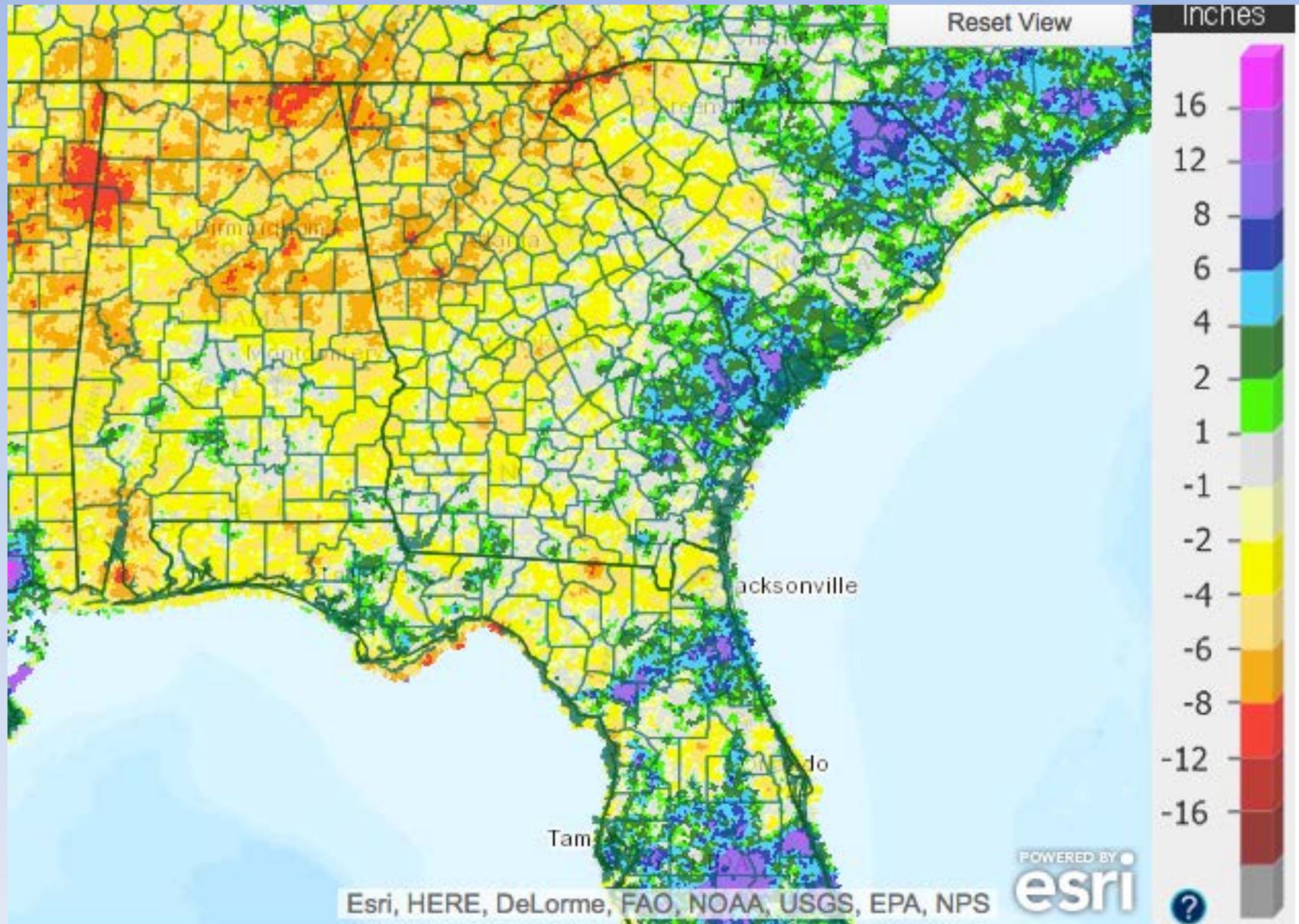
Rainfall – Last 30 Days



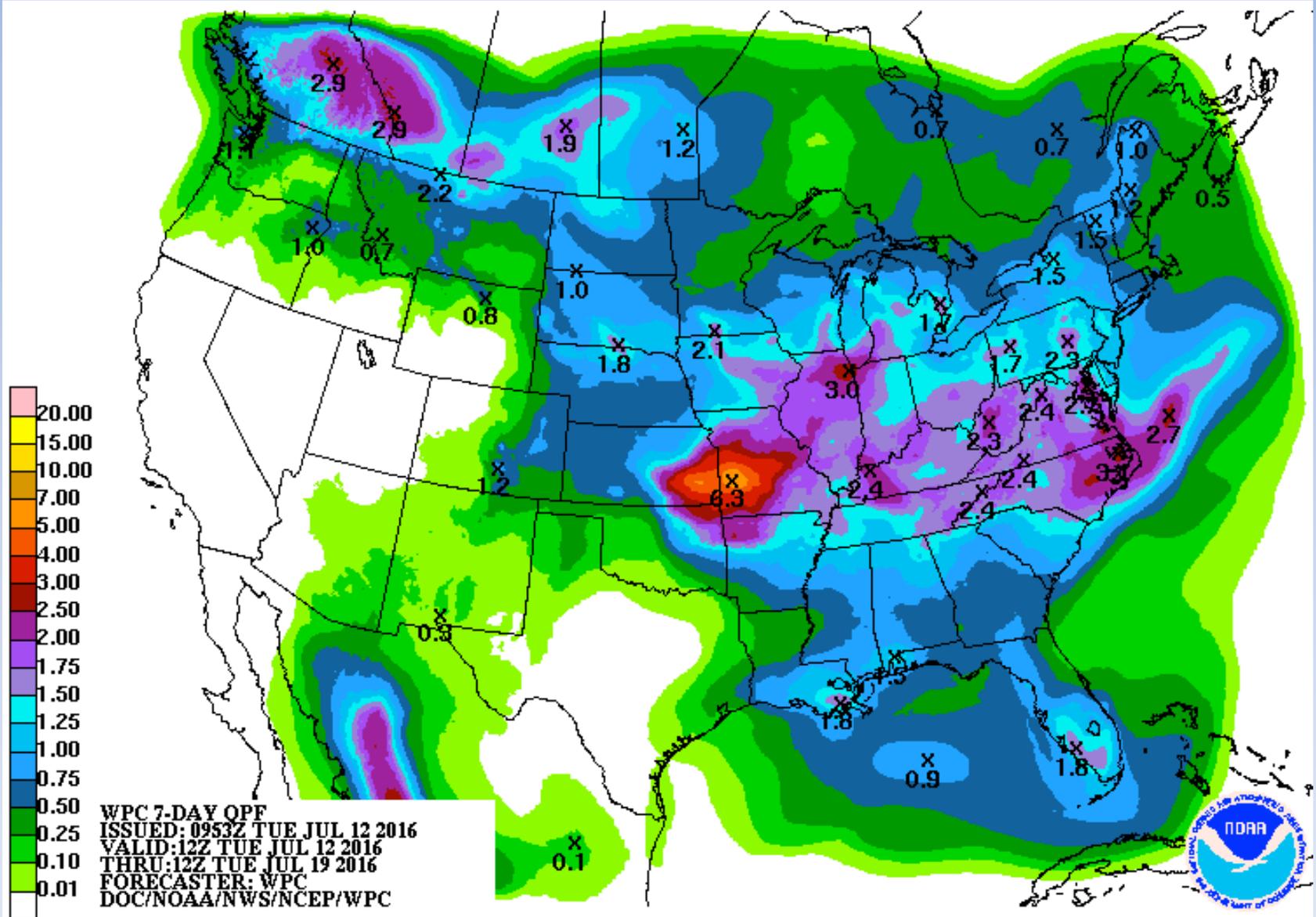
Lawn and Garden Moisture Index



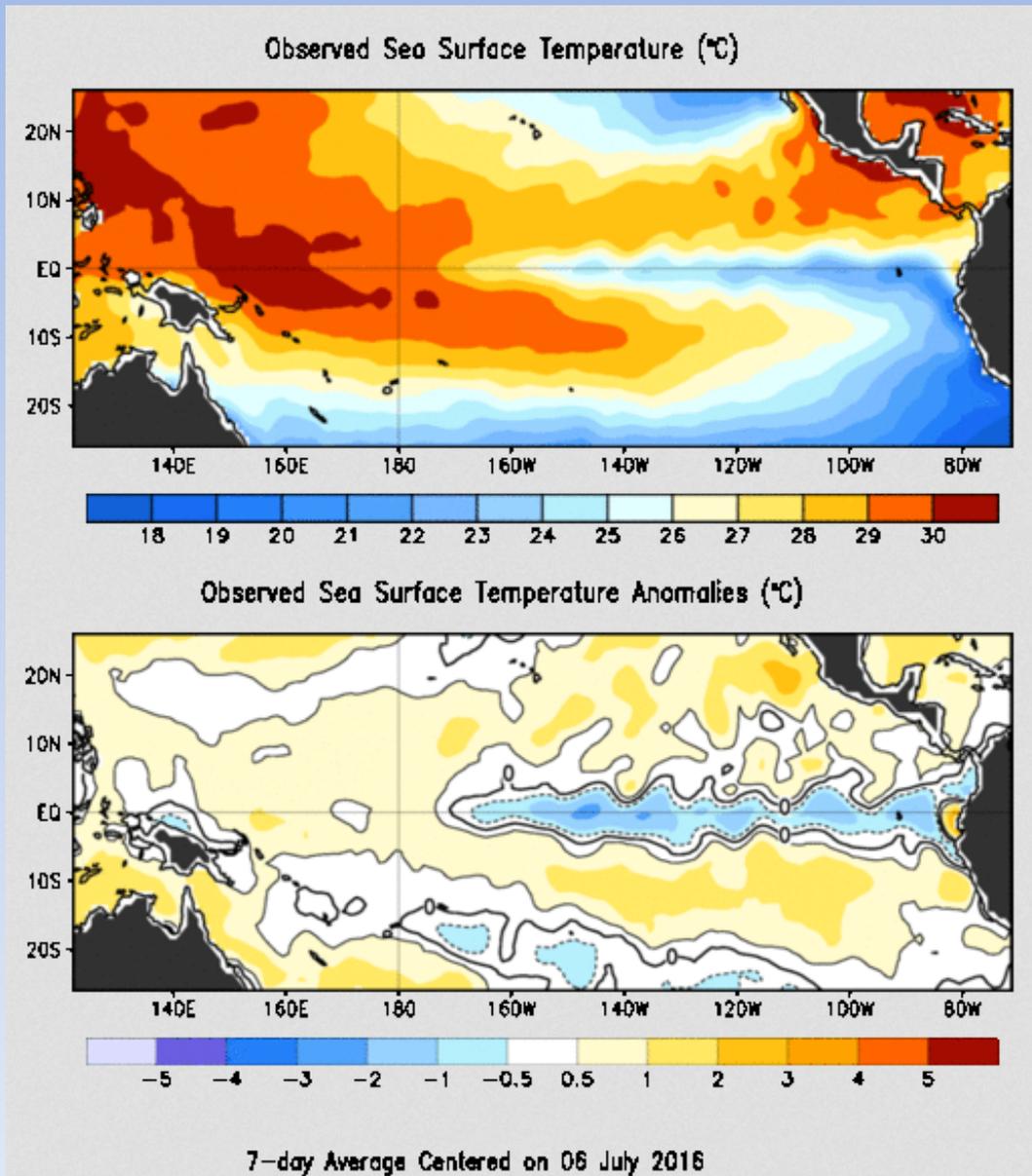
90-day Rainfall Departures



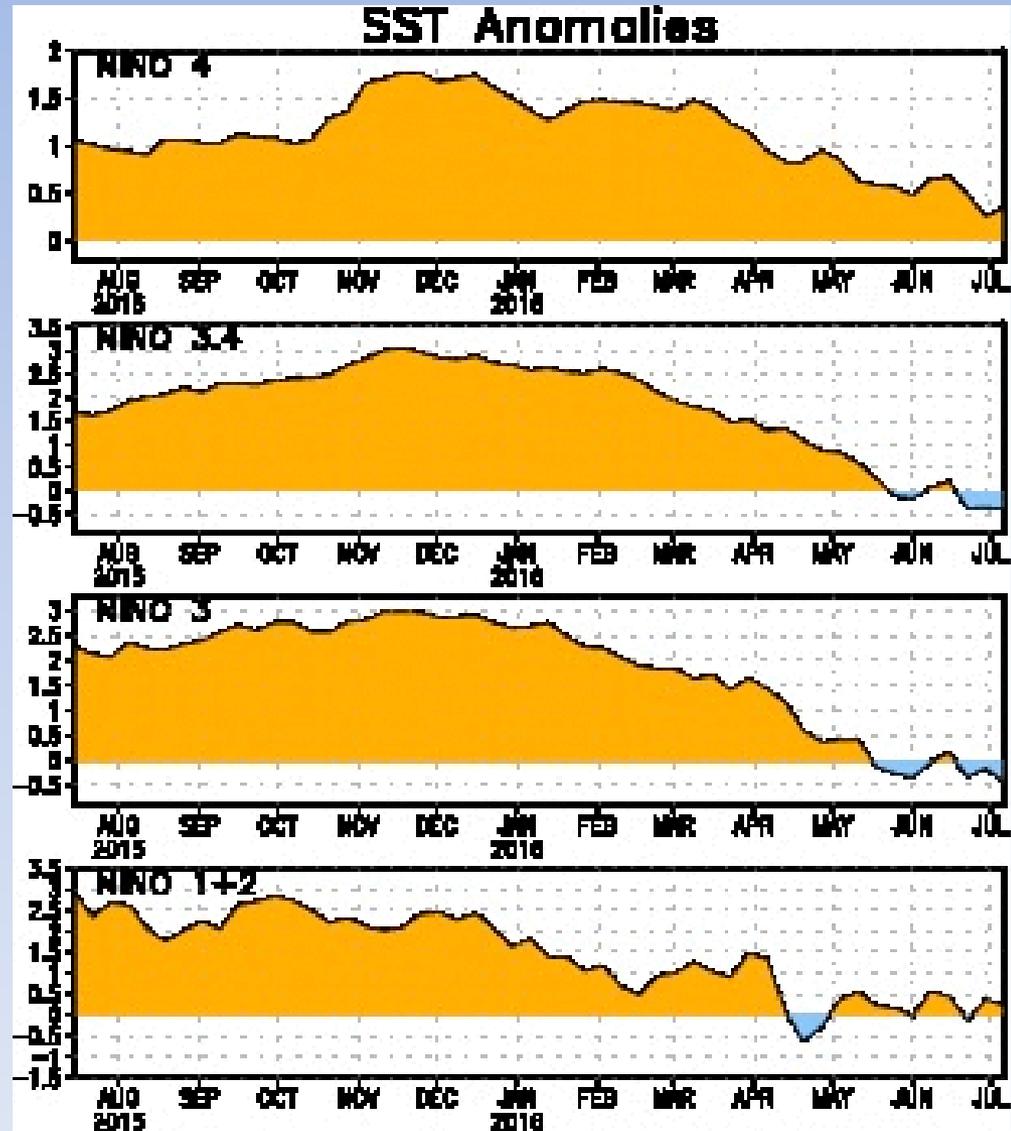
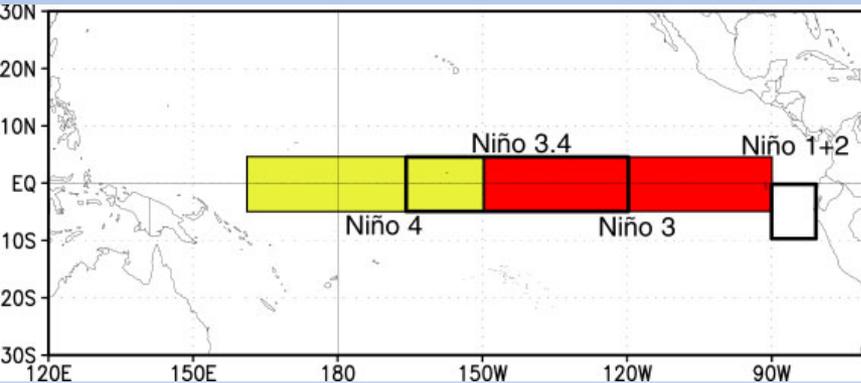
7-Day Precipitation Forecast



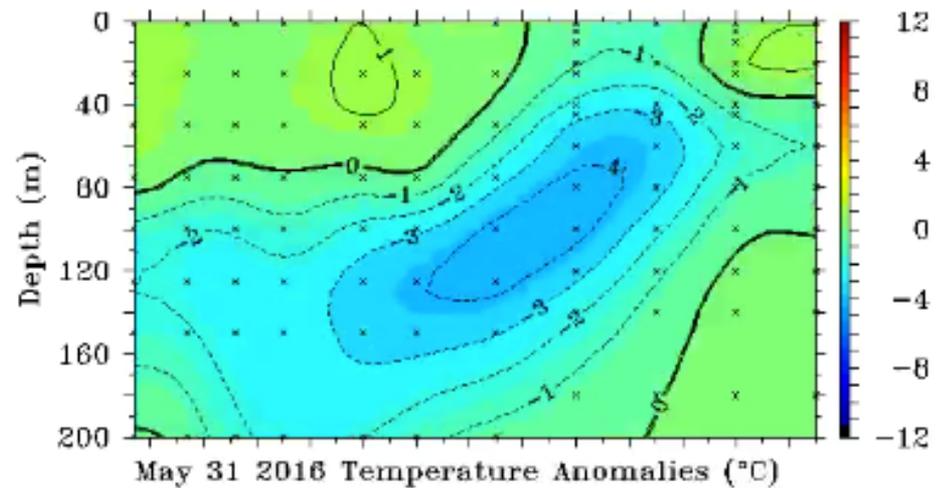
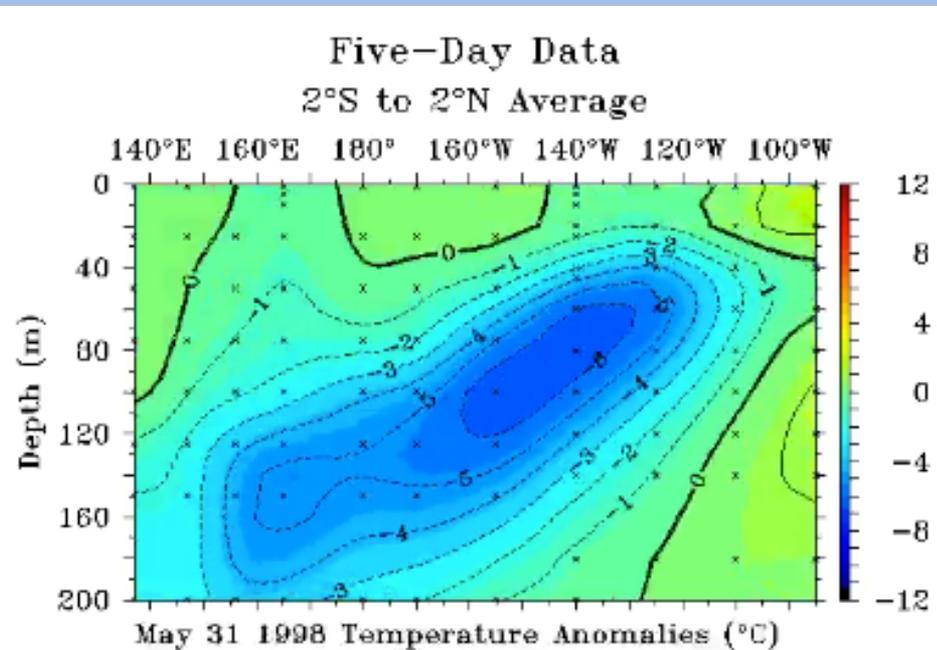
Current SST Anomalies



Sea Surface Temperature Indices



Subsurface Temperatures

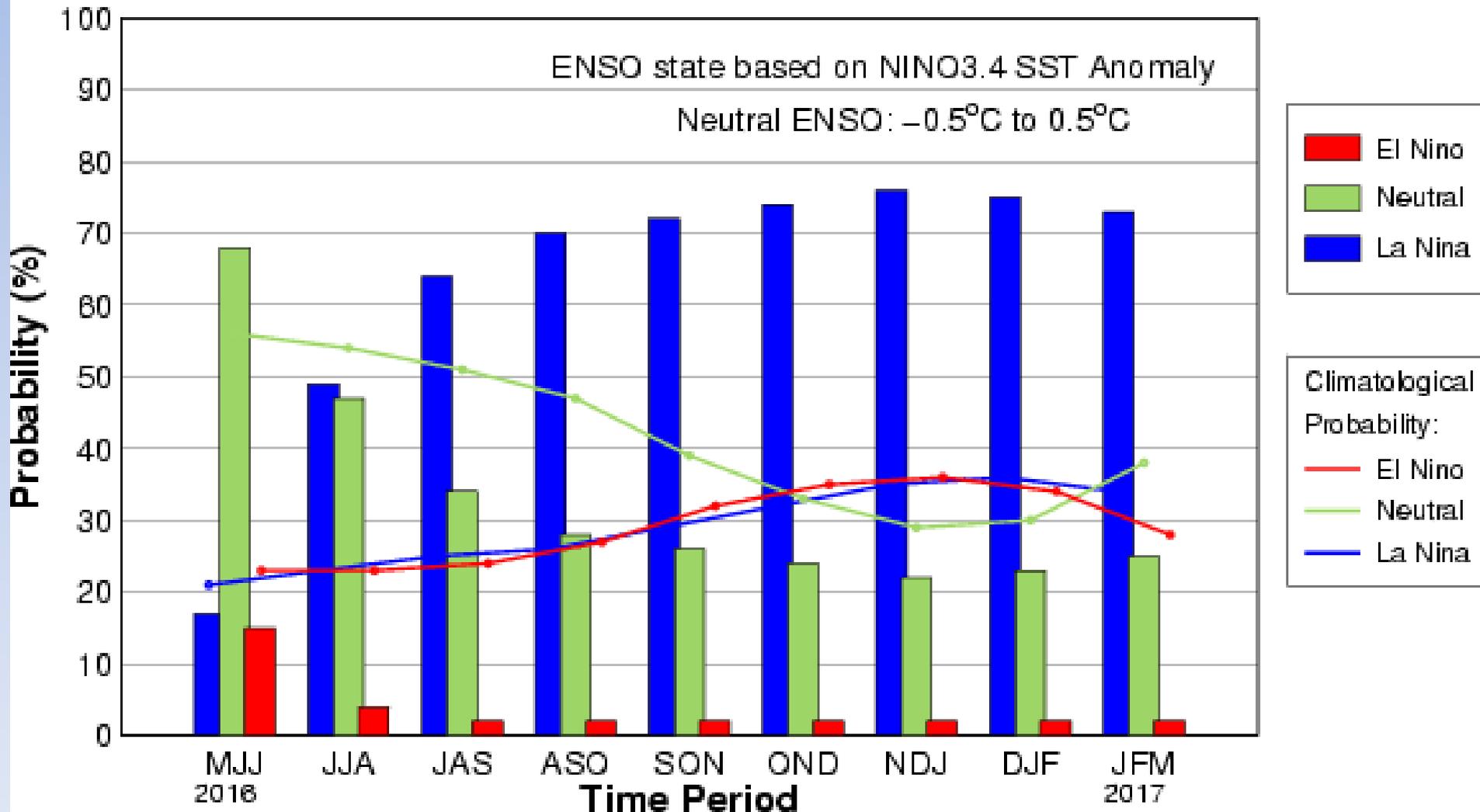


La Nina on the Way?

Early-Jun CPC/IRI Official Probabilistic ENSO Forecast

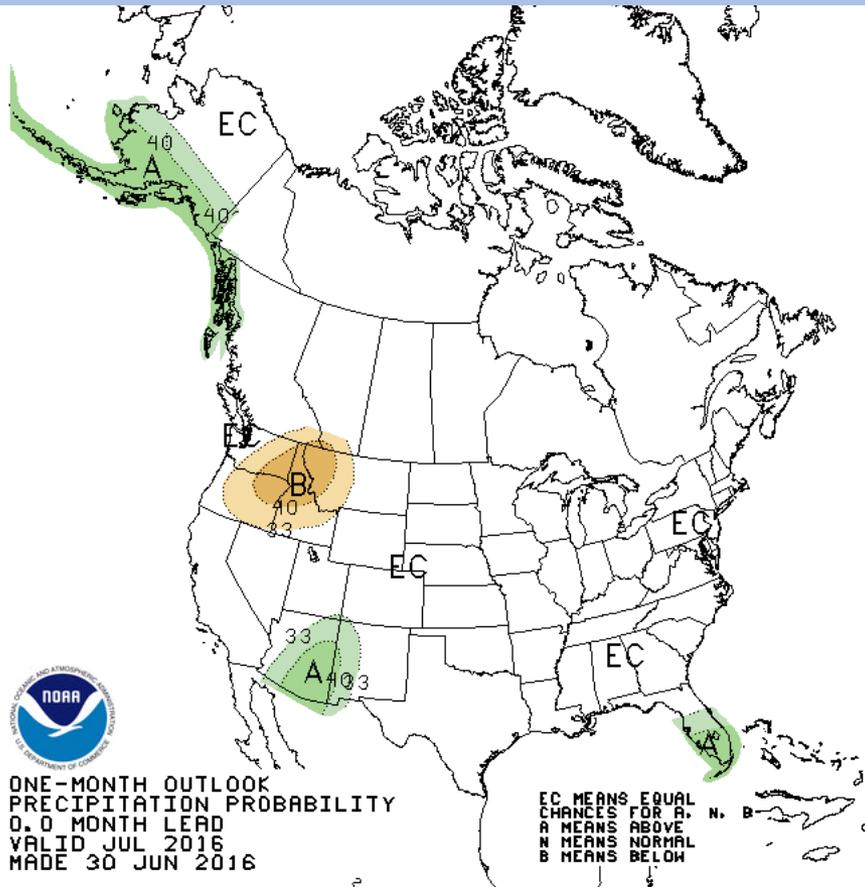
ENSO state based on NINO3.4 SST Anomaly

Neutral ENSO: -0.5°C to 0.5°C

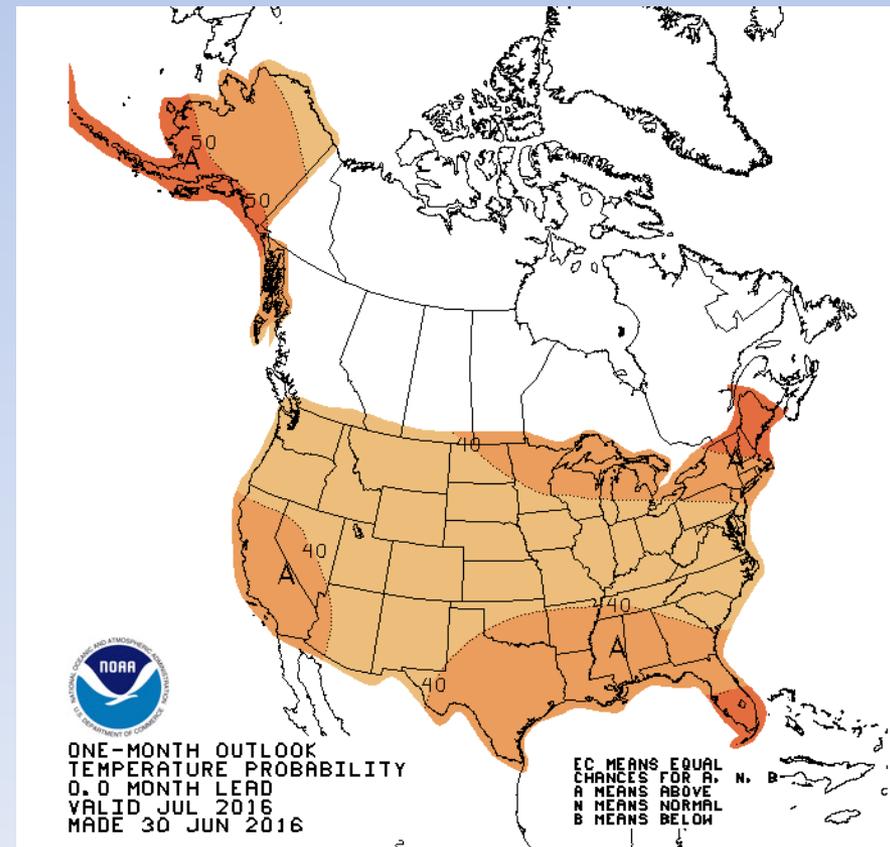


Official NOAA 1-Month Outlook

Precipitation

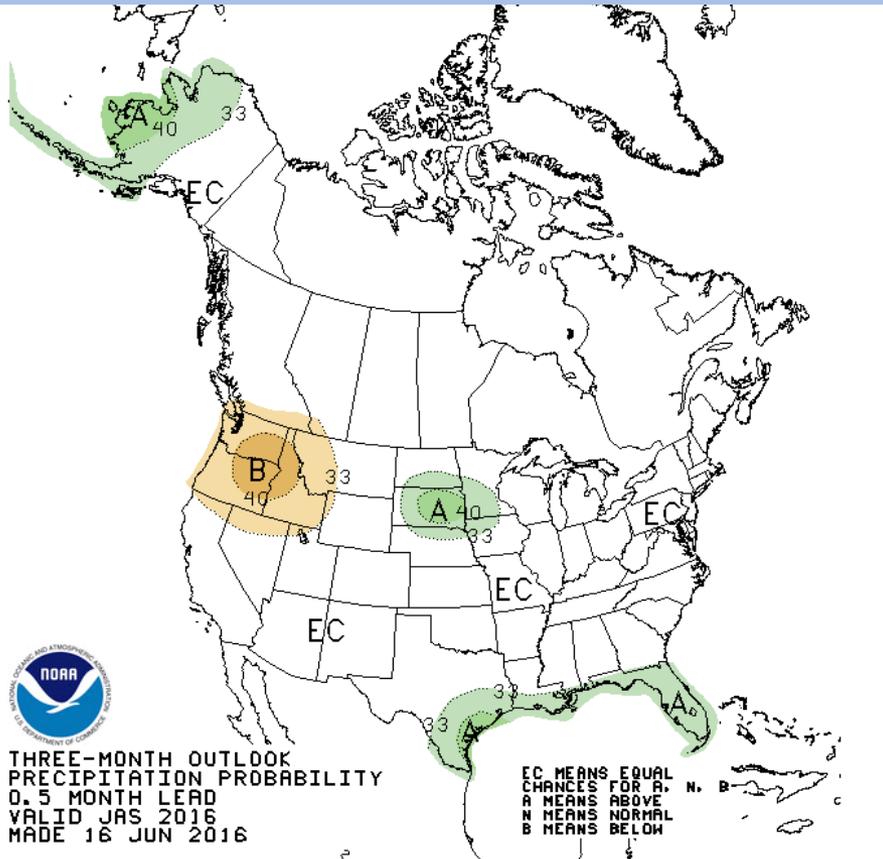


Temperature

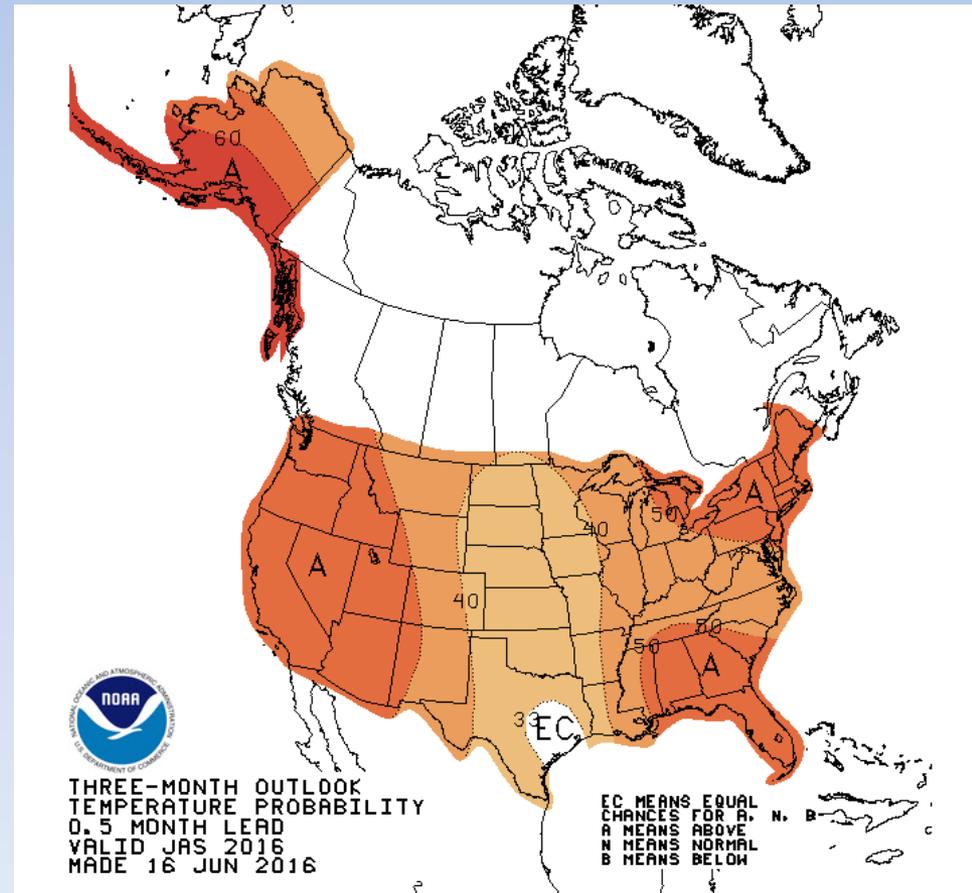


Official NOAA 3-Month Outlook

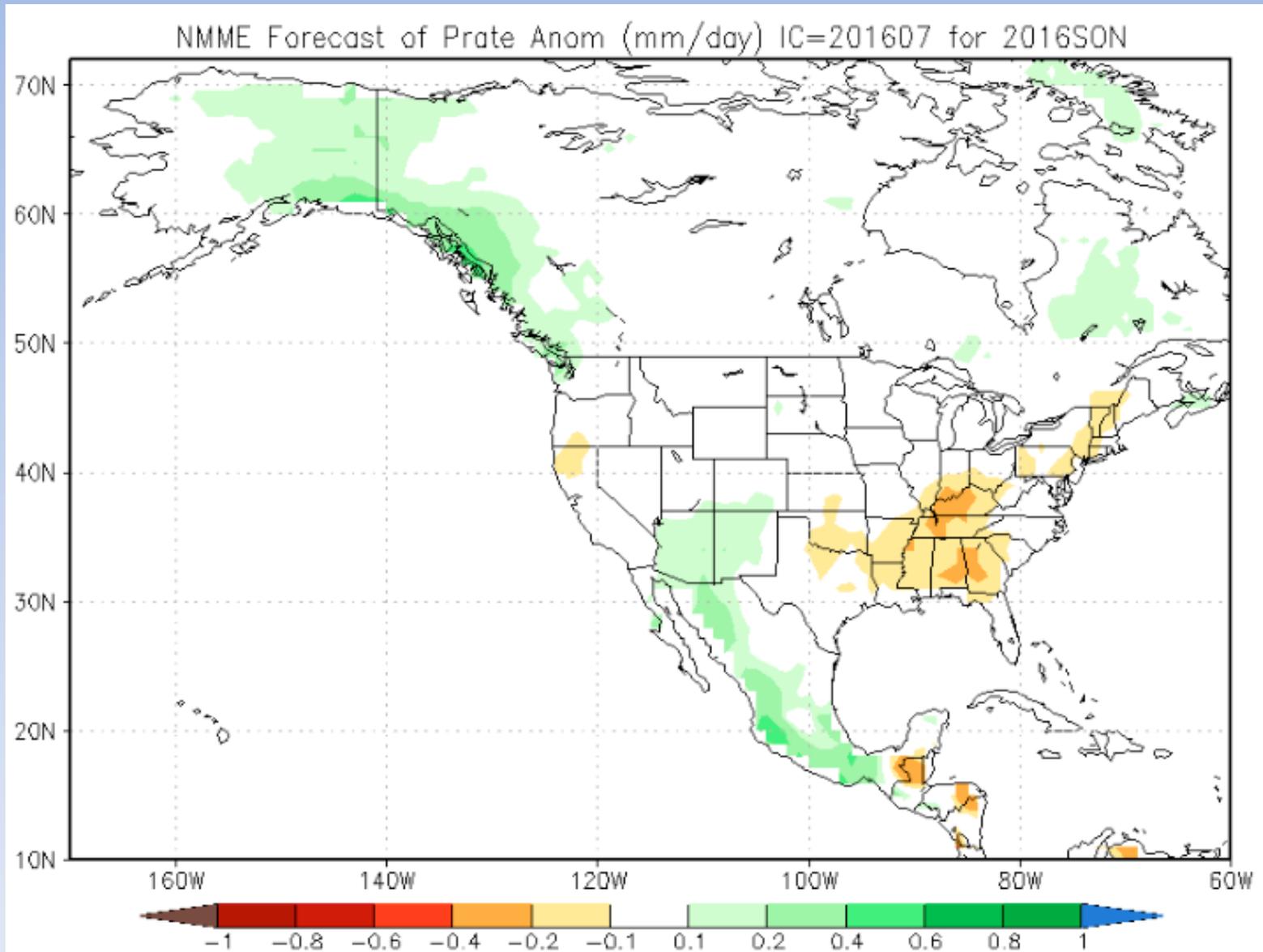
Precipitation



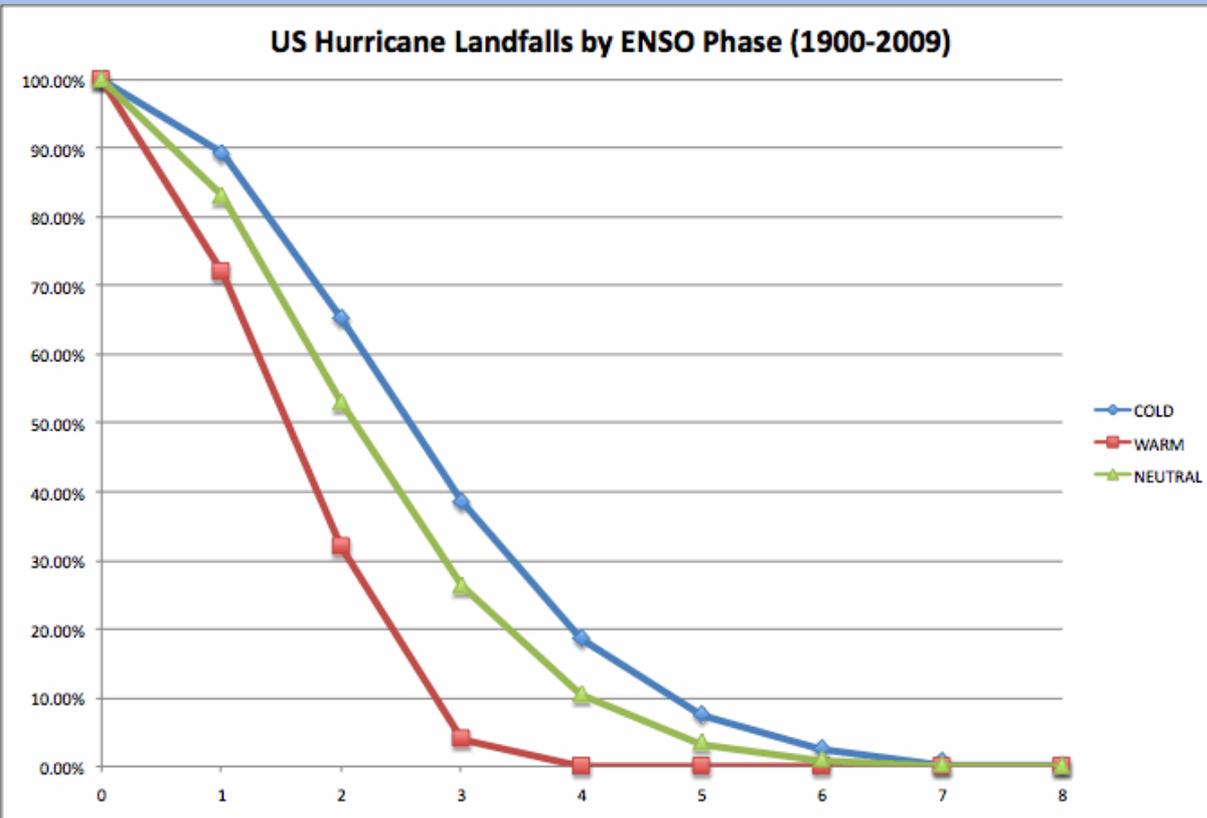
Temperature



NMME Fall Precip. Forecast



Hurricane Season Forecast



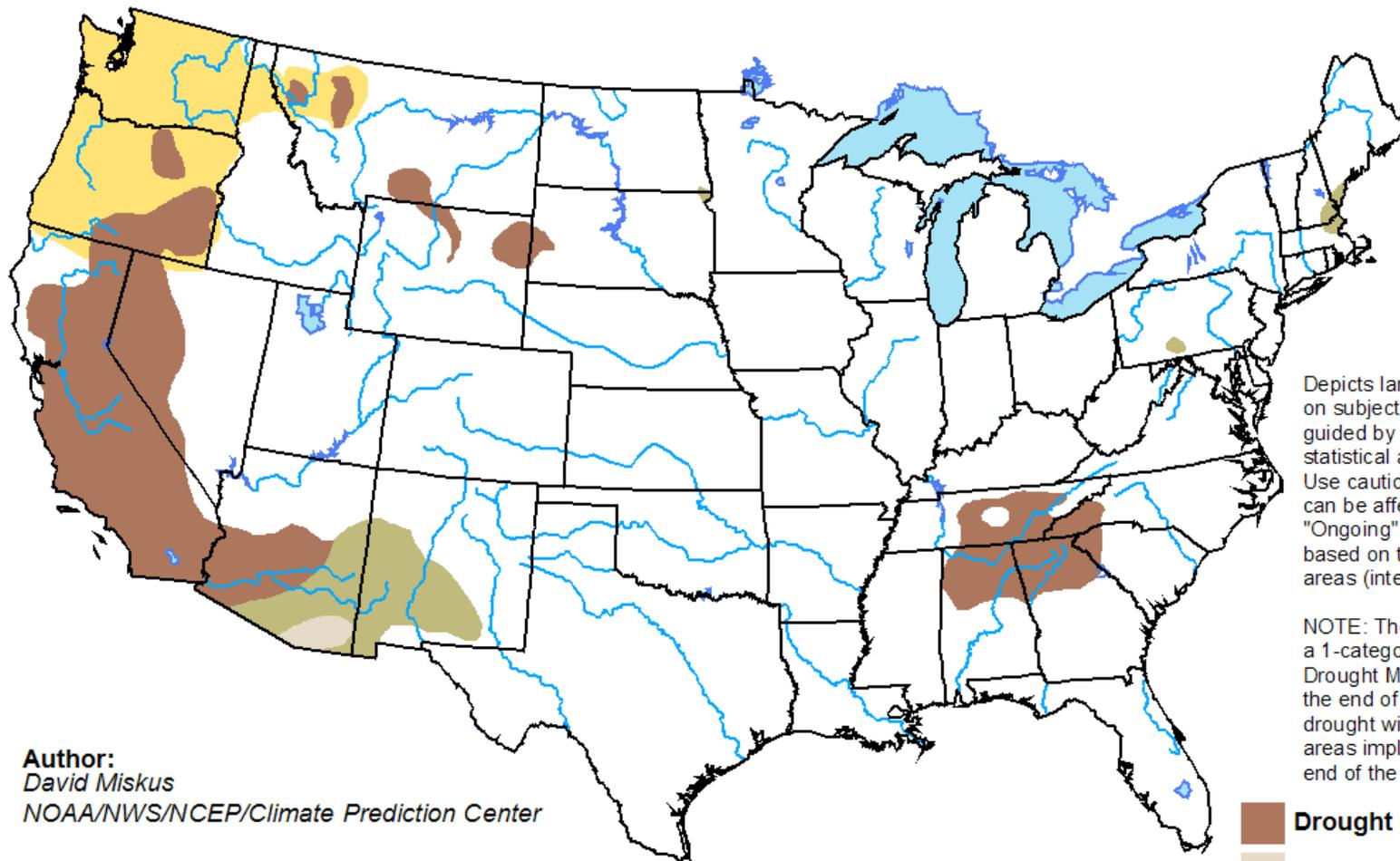
“La Niña tend to favor an environment more favorable for Atlantic hurricane formation, while cool far North Atlantic SSTs may force higher-than-normal pressures and stronger trades in the tropical Atlantic for the peak of the hurricane season.” - Phil Klotzback, CSU

- CSU predicts 15 named storms, 6 hurricanes, and 2 major hurricanes
- NOAA forecasts 70% chance of 10-16 storms, 4-8 hurricanes, 1-4 major hurricanes.
- 2 or more U.S. hurricane landfalls twice as likely during La Nina

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for June 16 - September 30, 2016
Released June 16, 2016

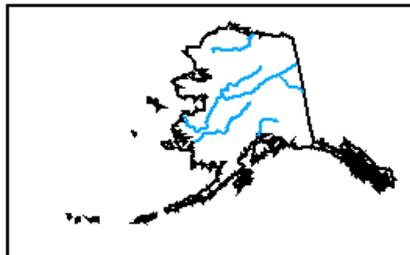


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:
David Miskus
NOAA/NWS/NCEP/Climate Prediction Center

-  Drought persists
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely



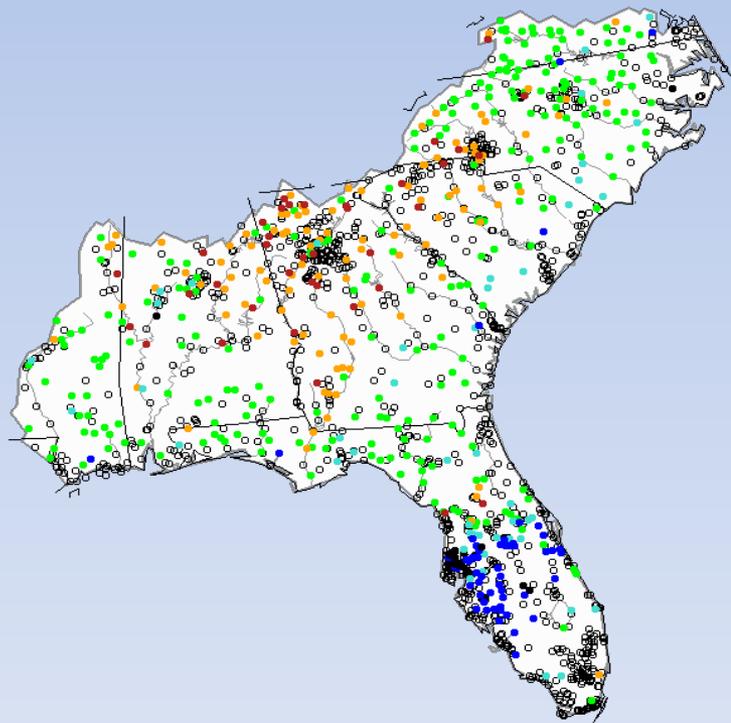
<http://go.usa.gov/3eZ73>

Streamflows and Groundwater

Realtime stream flow compared with historical monthly averages

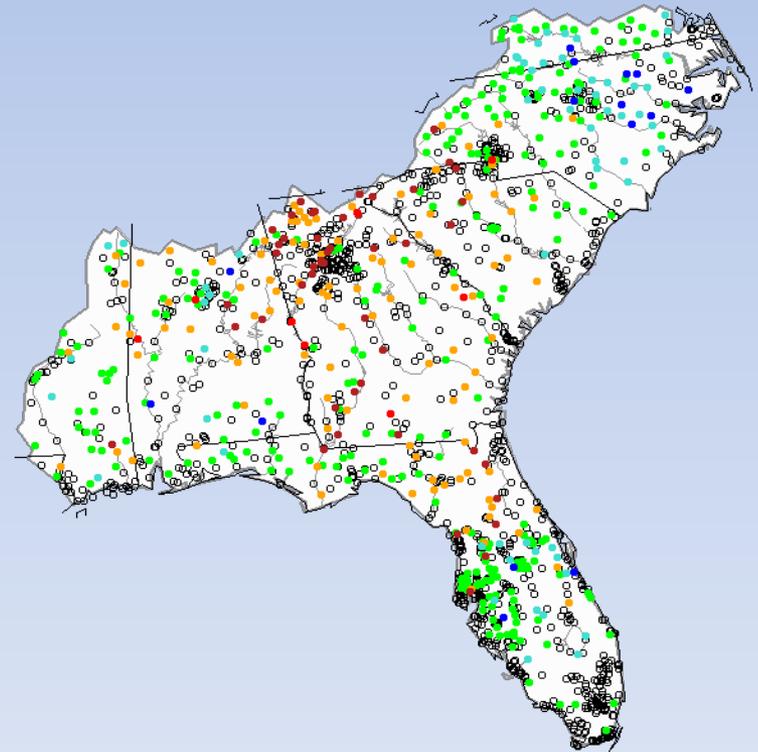
Previous Brief:

Tuesday, June 14, 2016 07:30ET



Current:

Monday, July 11, 2016 06:30ET



Explanation - Percentile classes						
●	●	●	●	●	●	●
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	



<http://waterwatch.usgs.gov>

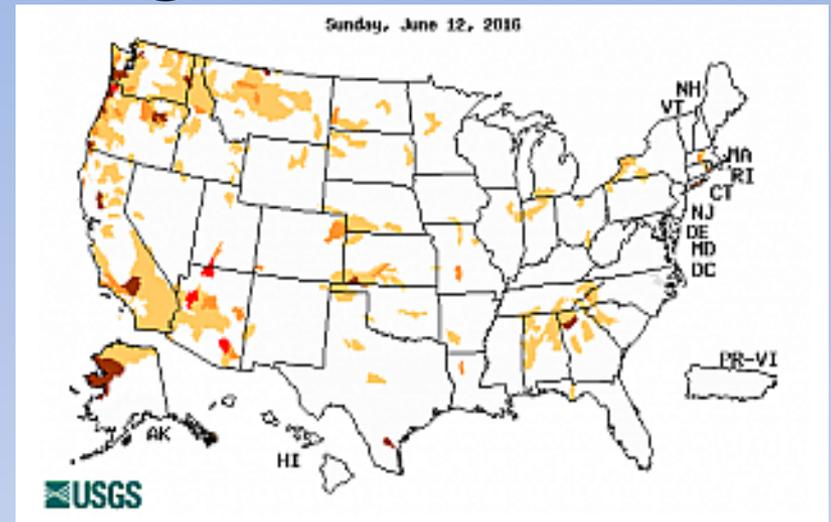
Below Normal 7-day Average Streamflows

Previous brief:

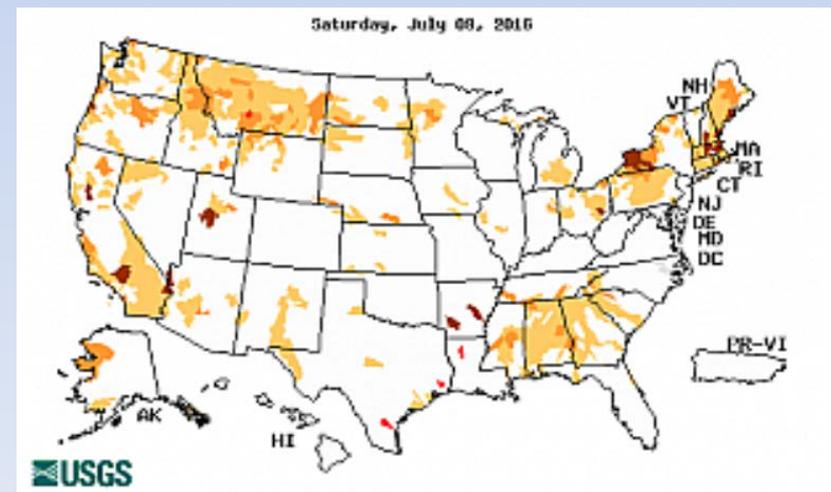
Below normal 7-day average streamflow as compared with historical streamflow for day shown

Current:

<http://waterwatch.usgs.gov>



Explanation - Percentile classes				
Low	≤ 5	6-9	10-24	25-100
Extreme hydrologic drought	Severe hydrologic drought	Moderate hydrologic drought	Below normal	Above normal

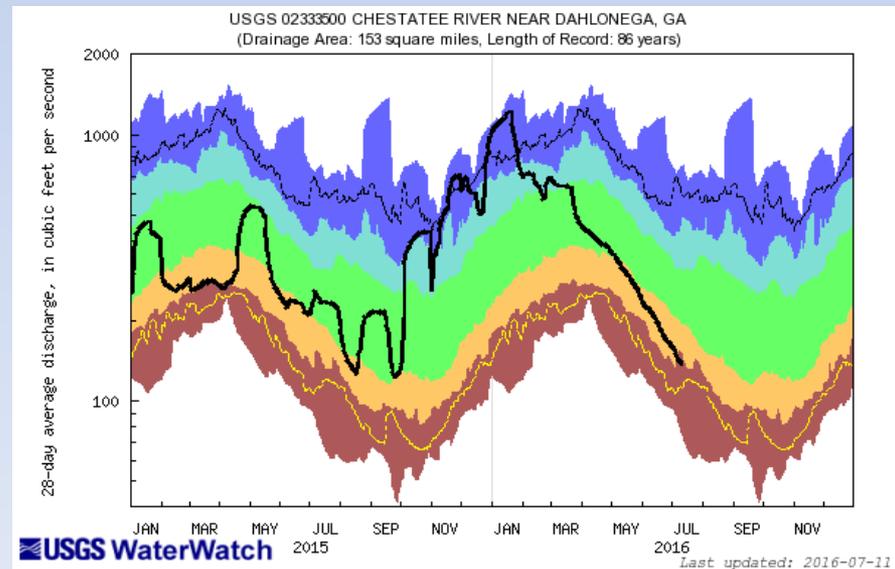
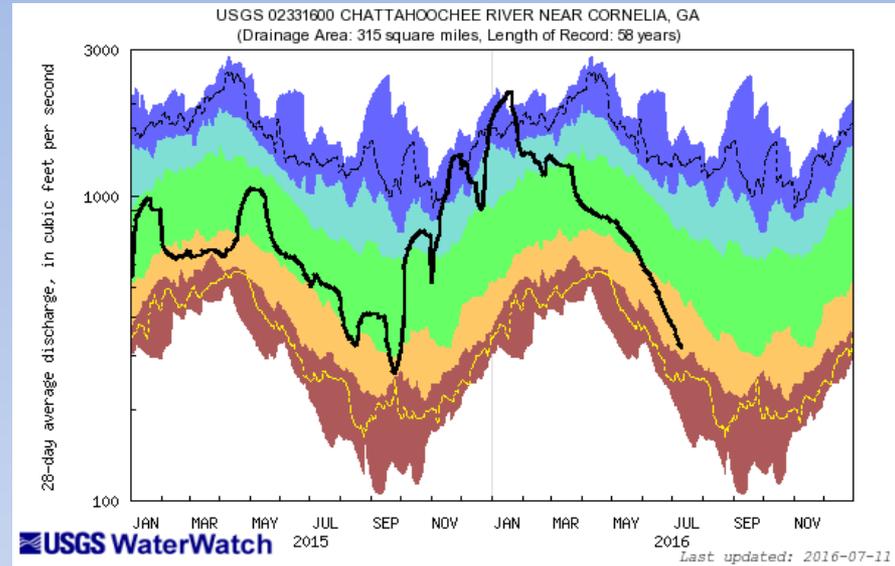


Lake Lanier Inflows

Chattahoochee near
Cornelia (02331600)

<http://waterwatch.usgs.gov>

Chestatee near
Dahlonega (02333500)



Explanation - Percentile classes						Flow
lowest-10th percentile	5	10-24	25-75	76-90	95	
Much below Normal		Below normal	Normal	Above normal	Much above-normal	

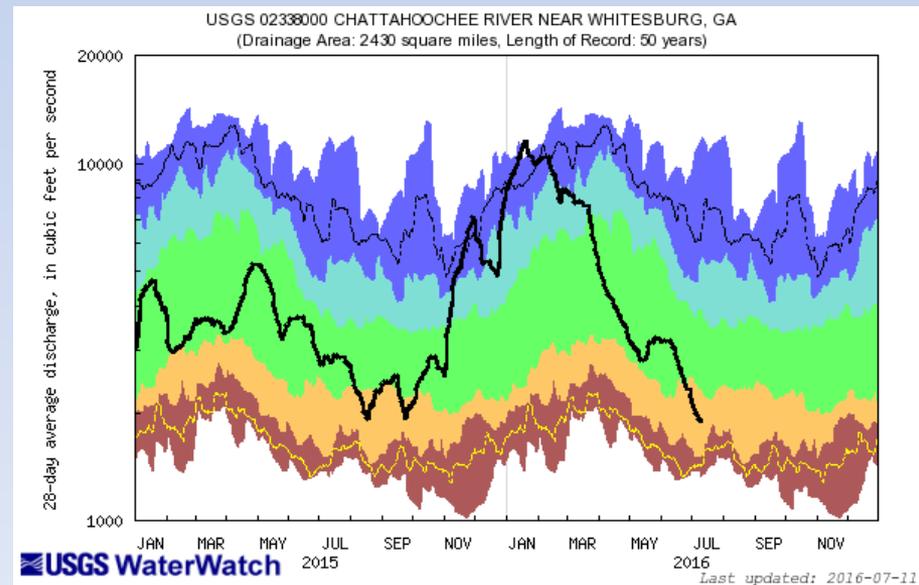
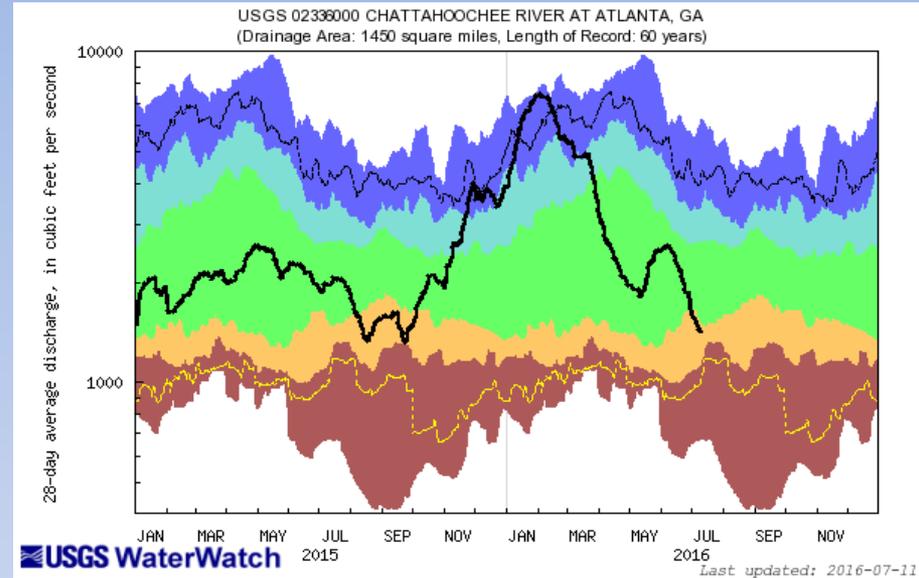
Current Streamflows

Chattahoochee at Atlanta (02336000)

<http://waterwatch.usgs.gov>

Chattahoochee near Whitesburg (02338000)

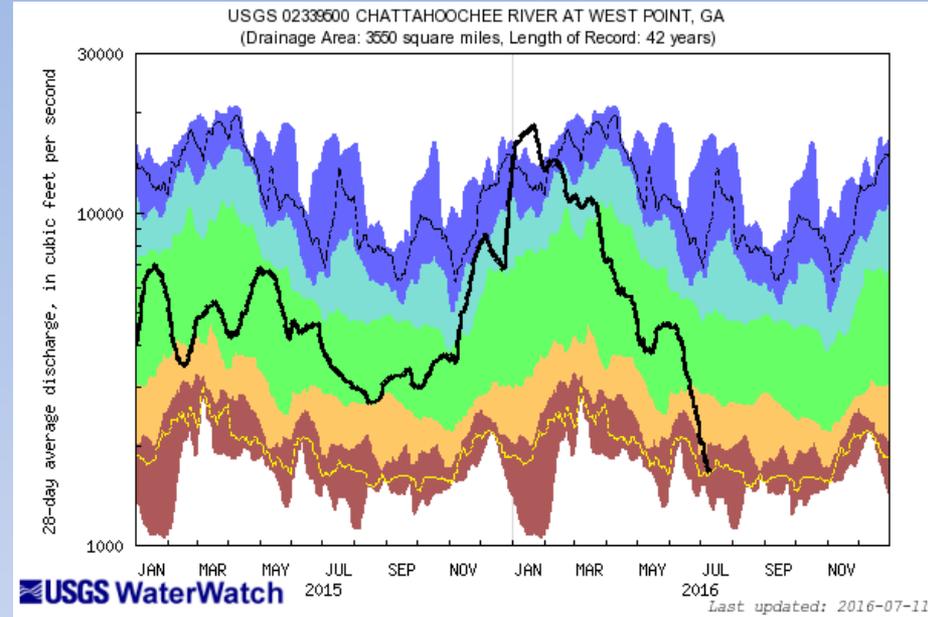
Explanation - Percentile classes						Flow
lowest-10th percentile	5	10-24	25-75	76-90	95	
Much below Normal	Below normal	Normal	Above normal	Much above-normal		



Current Streamflows

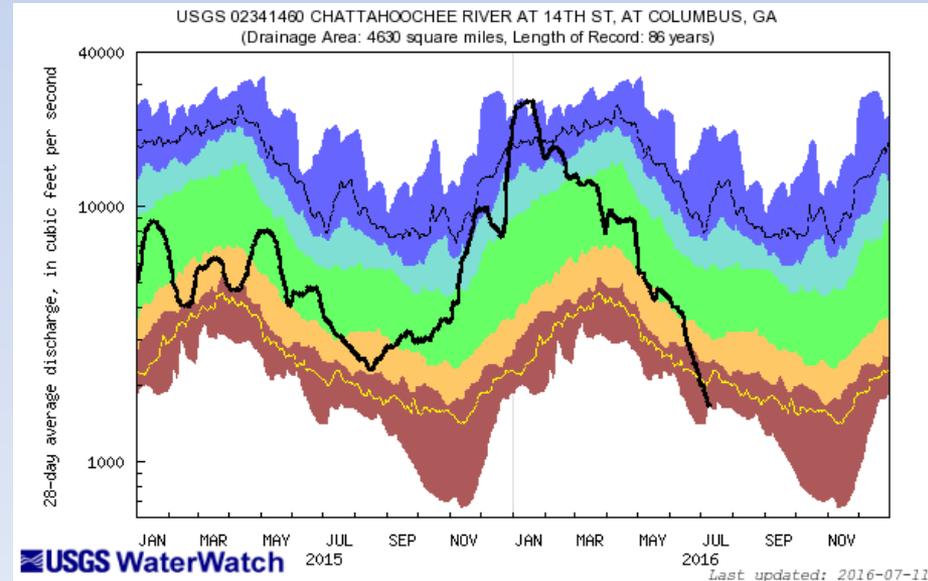
Chattahoochee at West Point (02339500)

<http://waterwatch.usgs.gov>



Chattahoochee at Columbus(02341460)

Explanation - Percentile classes						Flow
lowest-10th percentile	5	10-24	25-75	76-90	95	
Much below Normal	Below normal	Normal	Above normal	Much above-normal		



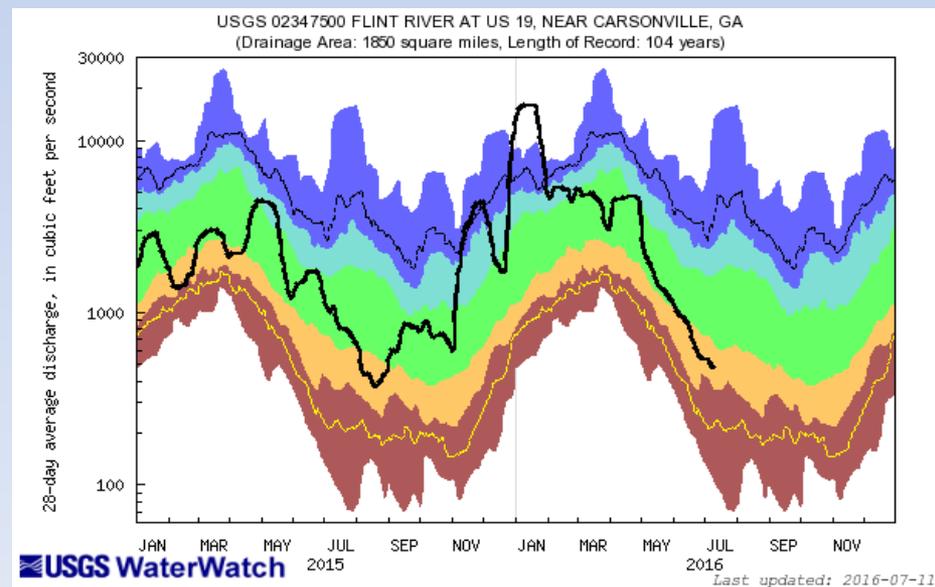
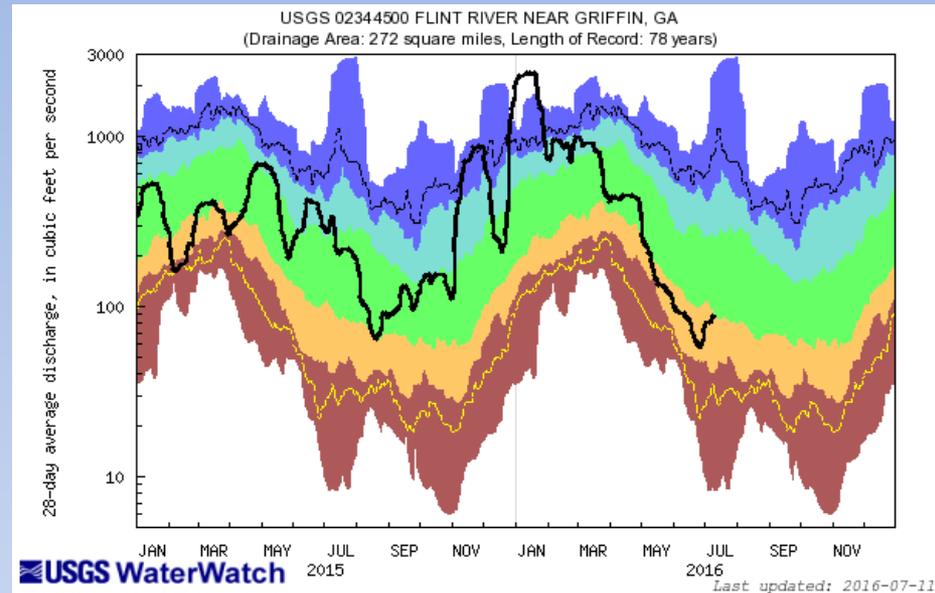
Current Streamflows

Flint River near Griffin (02344500)

<http://waterwatch.usgs.gov>

Flint River near Carsonville (02347500)

Explanation - Percentile classes						Flow
lowest-10th percentile	5	10-24	25-75	76-90	95	
Much below Normal	Below normal	Normal	Above normal	Much above-normal		



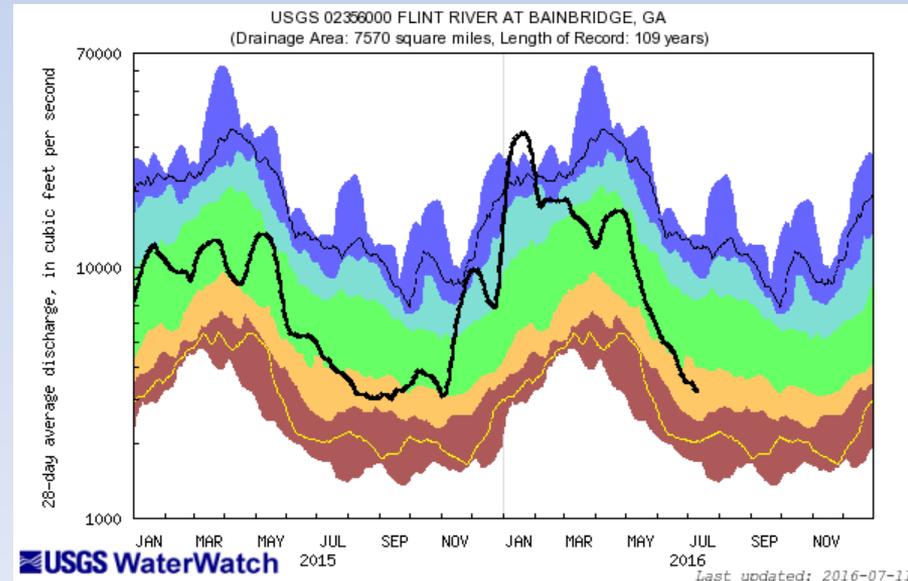
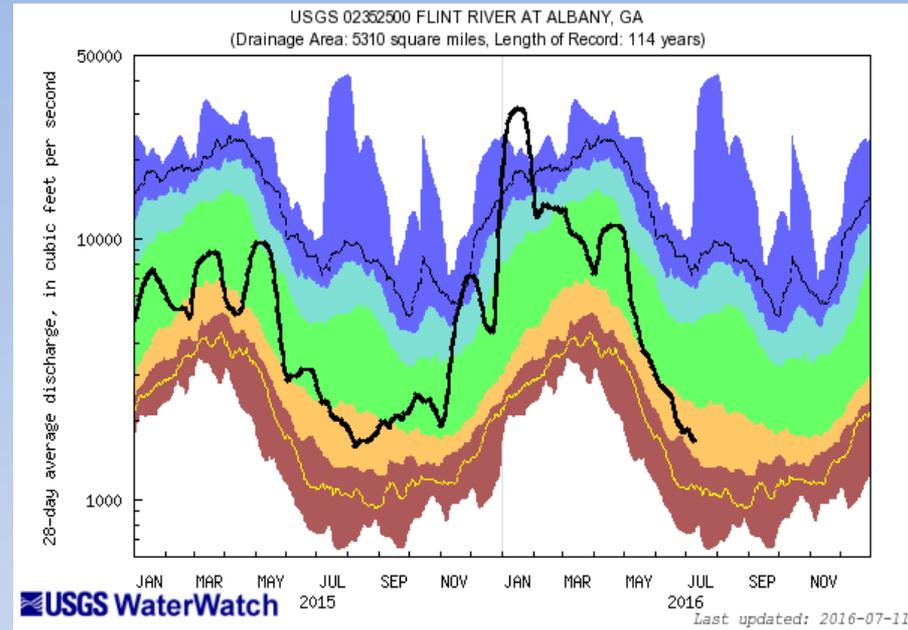
Current Streamflows

Flint River at Albany (02352500)

<http://waterwatch.usgs.gov>

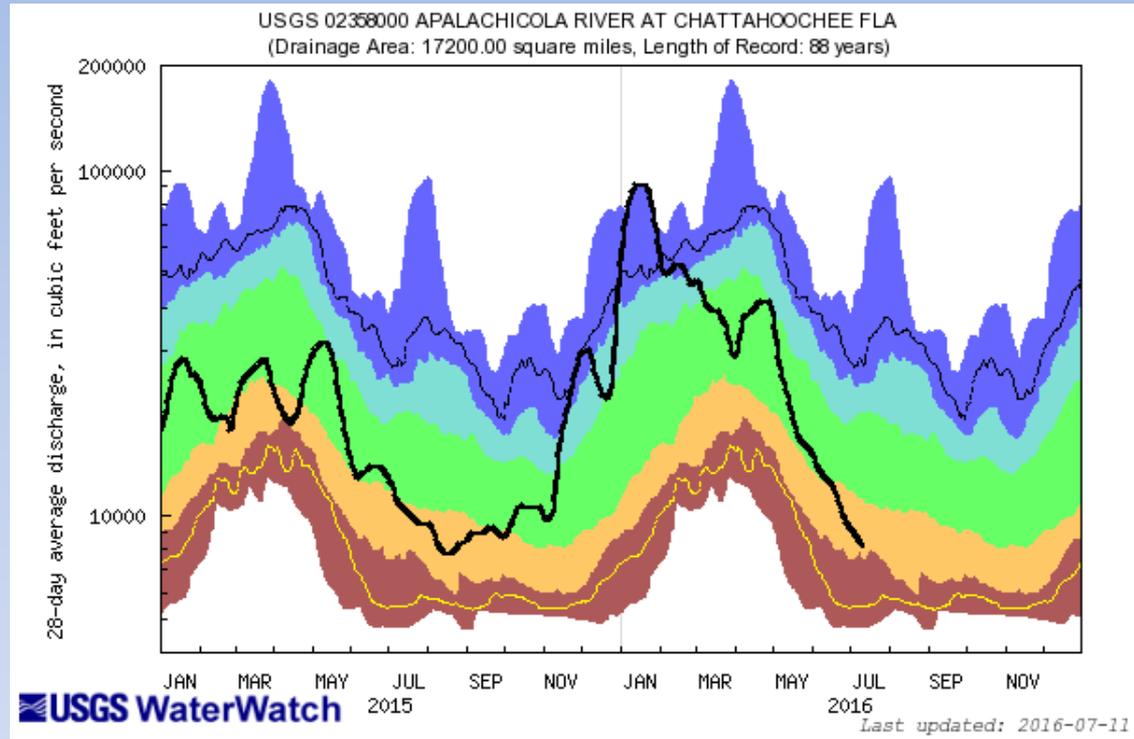
Flint at Bainbridge (02356000)

Explanation - Percentile classes						Flow
lowest-10th percentile	5	10-24	25-75	76-90	95	
Much below Normal	Below normal	Normal	Above normal	Much above-normal		



Streamflows

Apalachicola at Chattahoochee (02358000)

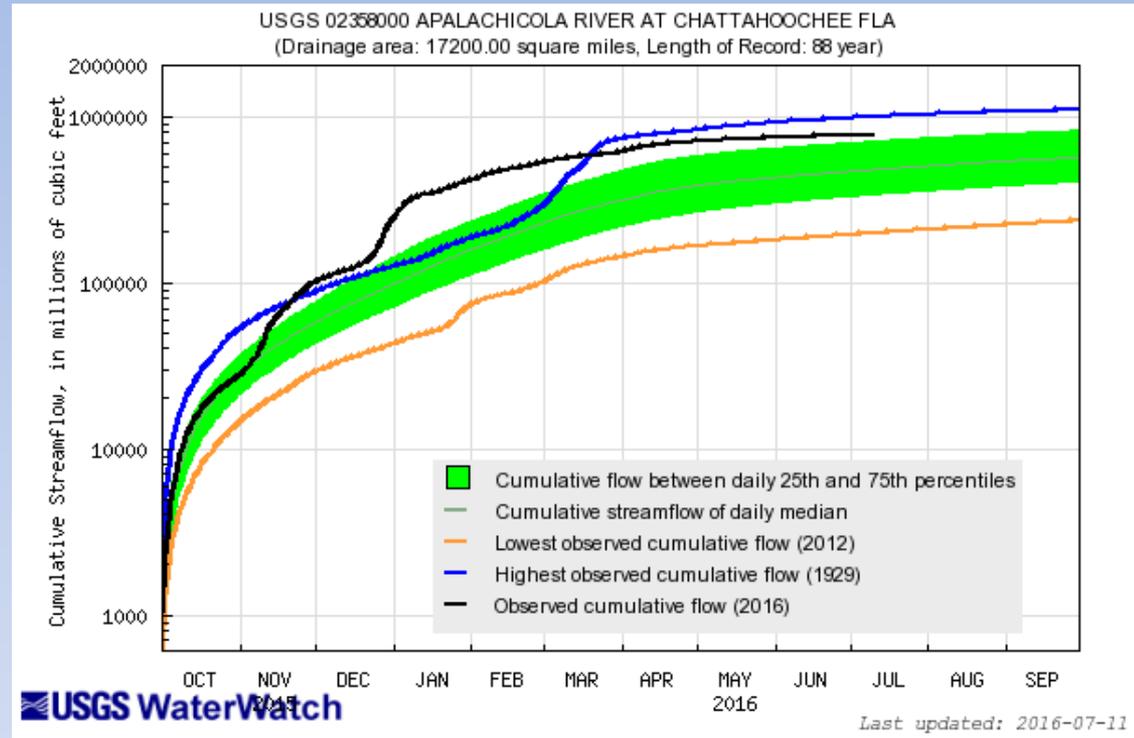


<http://waterwatch.usgs.gov>

Explanation - Percentile classes							
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile-highest	Flow
Much below Normal	Below normal	Normal	Above normal	Much above normal			

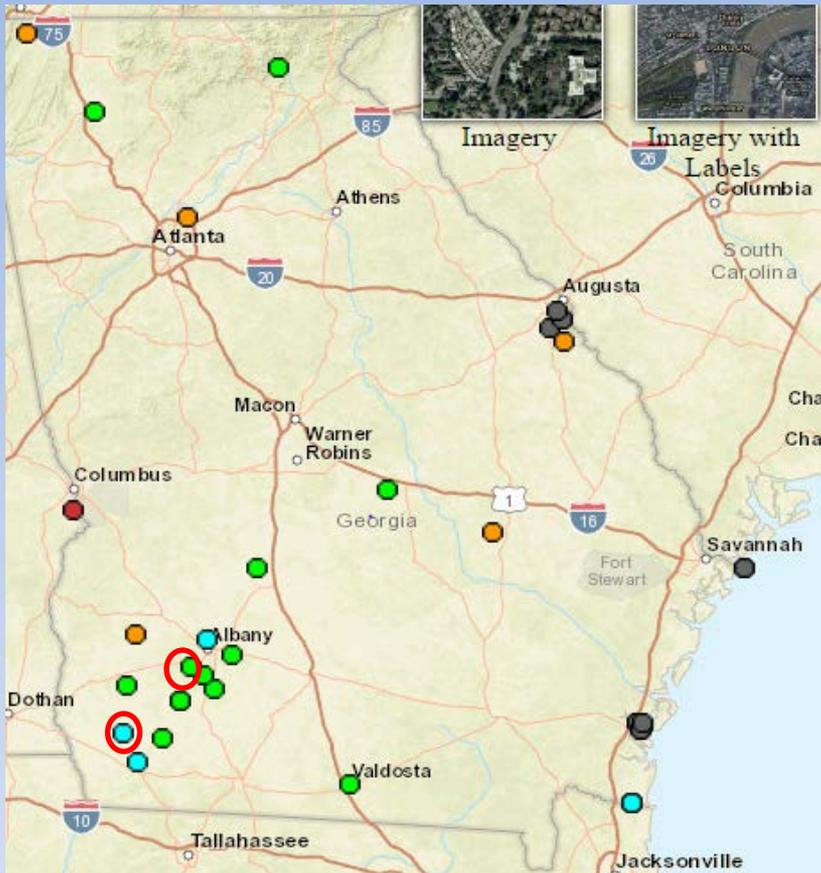
Streamflows

Apalachicola at Chattahoochee (02358000)

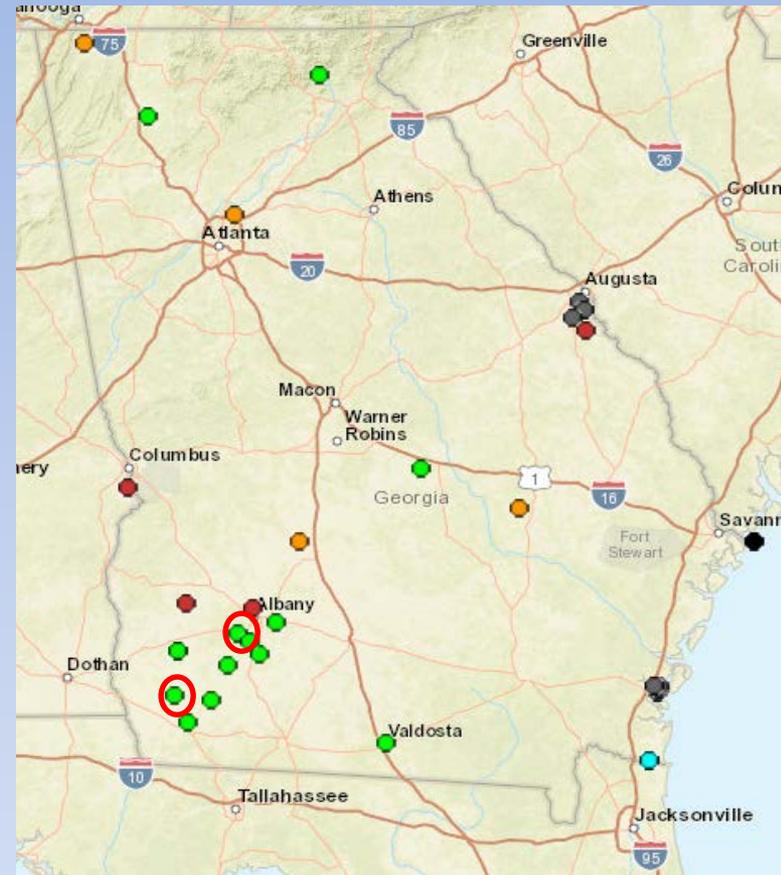


<http://waterwatch.usgs.gov>

Groundwater Conditions



Previous brief

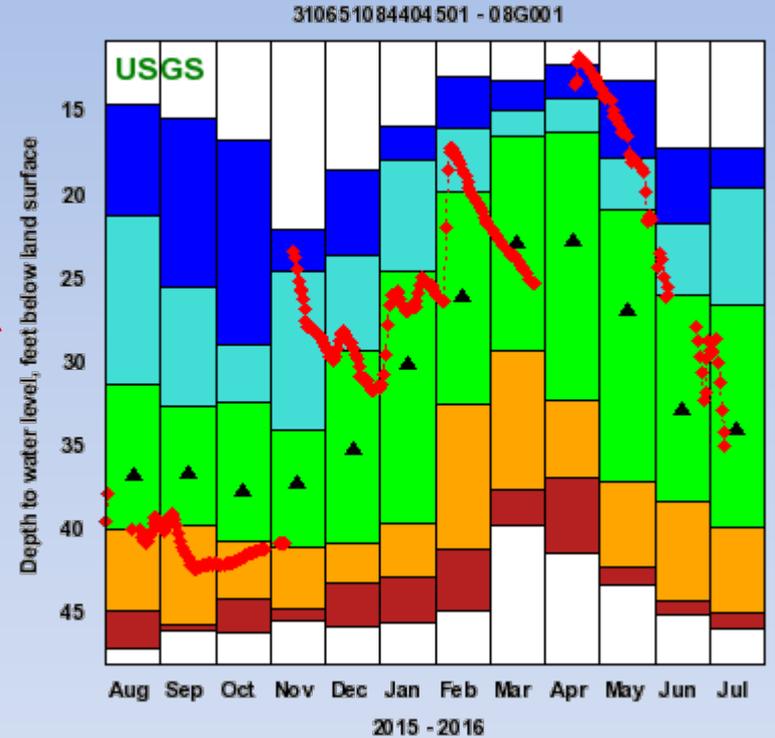
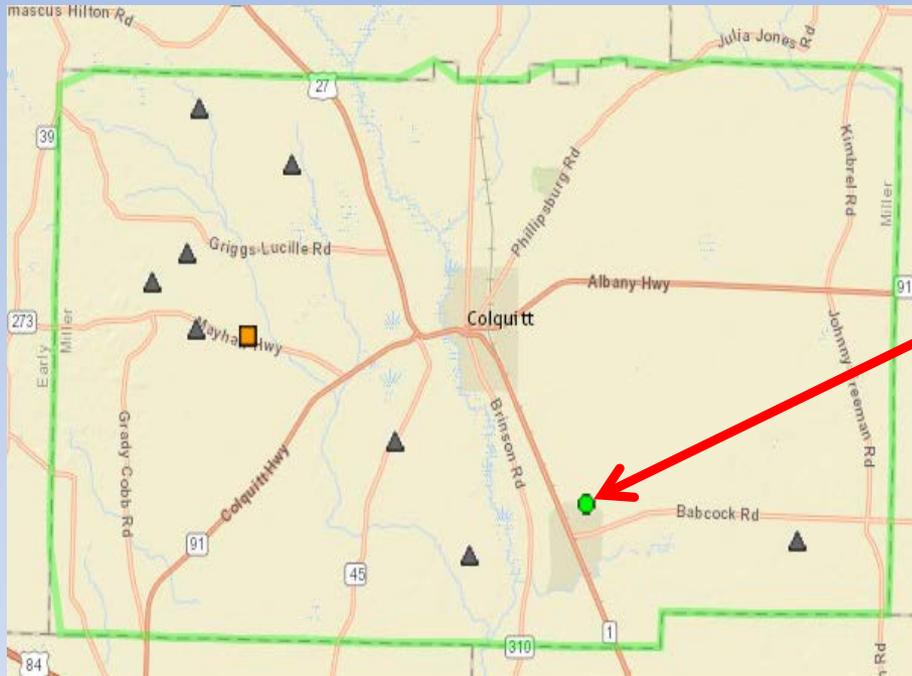


Current brief

Explanation - Percentile classes (symbol color based on most recent measurement)							Wells		Springs	
●	●	●	●	●	●	●	○	○	■	■
Low	<10	10-24	25-75	76-90	>90	High	□	□	□	□
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal		△	△	△	△
							Not Ranked			Periodic Measurements

<http://groundwaterwatch.usgs.gov>

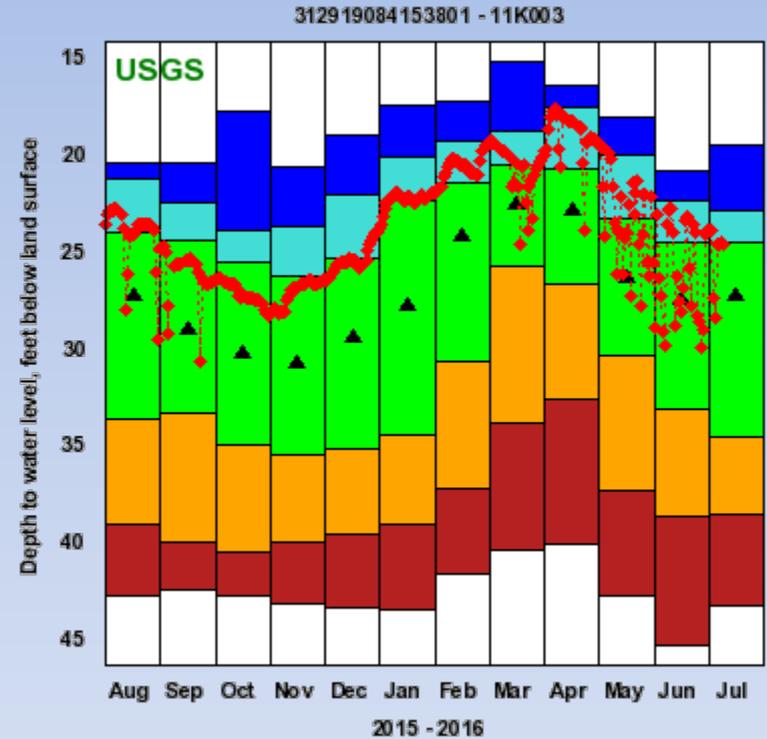
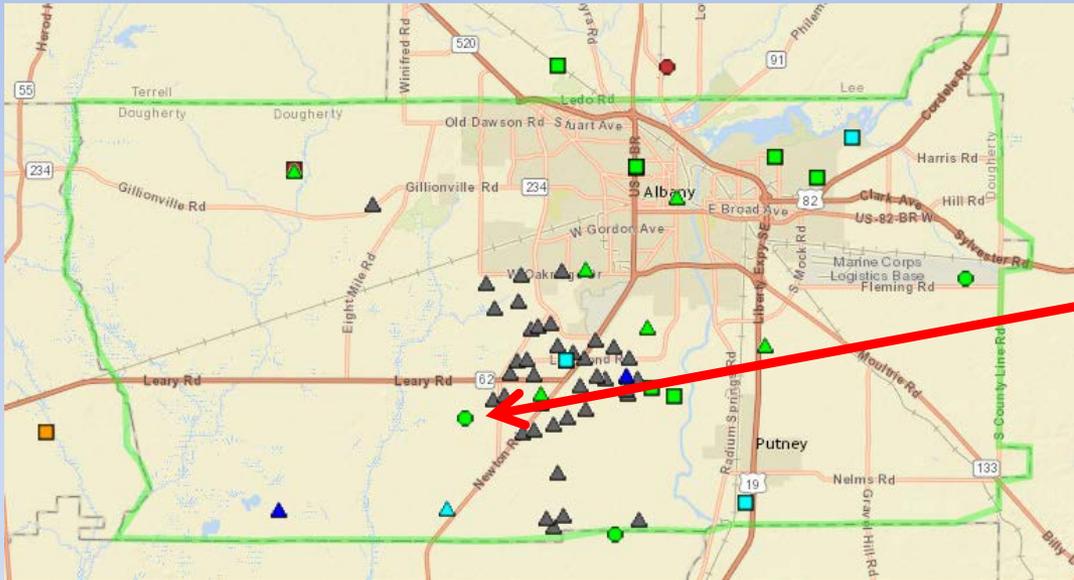
Groundwater Status – Miller County 08G001



Explanation - Percentile classes (symbol color based on most recent measurement)								Wells		Springs	
●	●	●	●	●	●	●	●	○	■	□	■
Low	<10	10-24	25-75	76-90	>90	High	Not Ranked	□	■	△	■
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal			△	■	△	■
								△	■	△	■
								△	■	△	■

(Upper Floridan Aquifer)

Groundwater Status – Dougherty County 11K003



Plot created 07/09/16 11:36



Explanation - Percentile classes (symbol color based on most recent measurement)								Wells		Springs	
Low	●	●	●	●	●	●	●	○	■	○	■
	<10	10-24	25-75	76-90	>90	High	Not Ranked	□	■	△	■
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal			□	■	△	■

(Upper Floridan Aquifer)

Streamflow Forecasts

Apalachicola Watershed

Southeast River Forecast Center



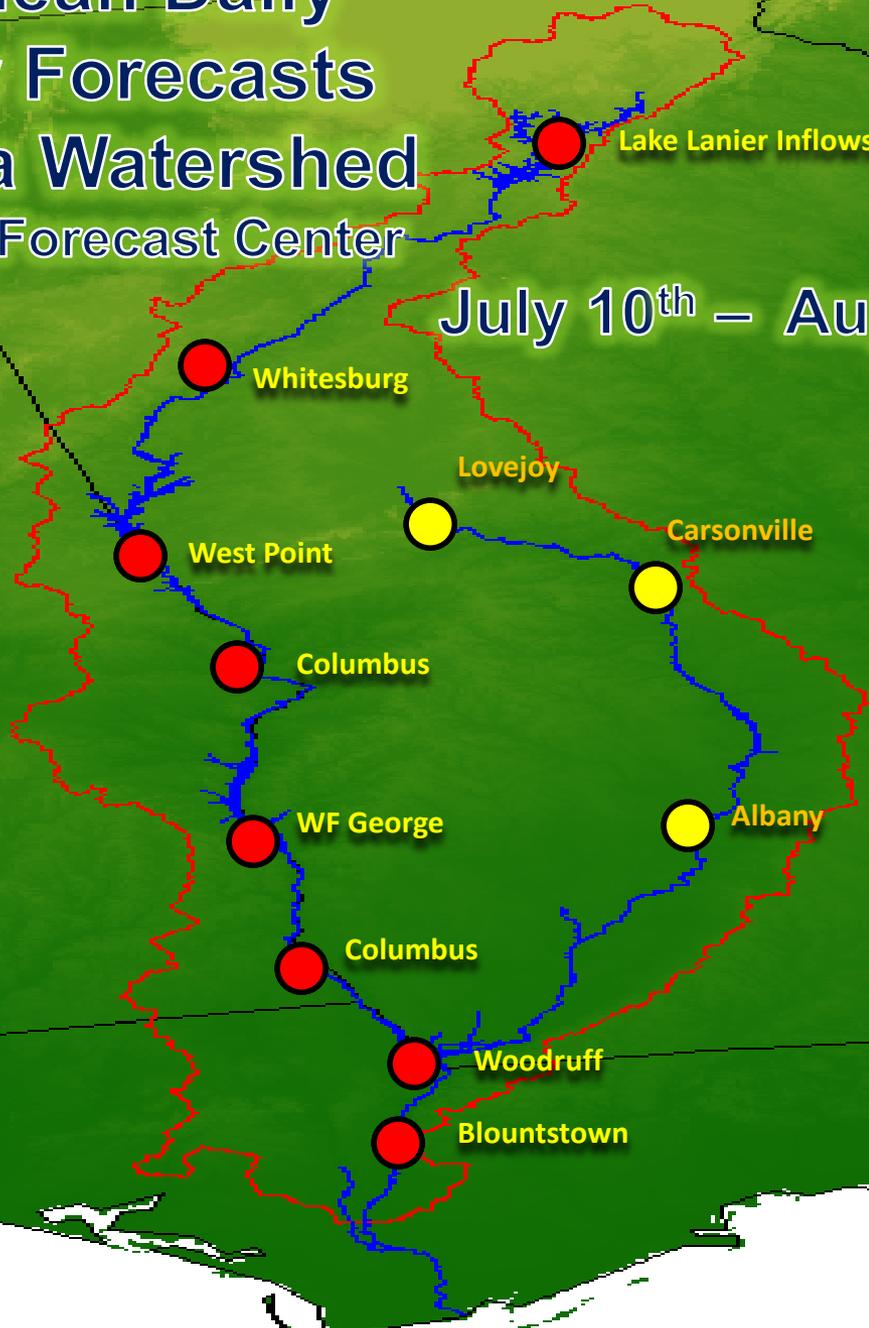
Todd Hamill



1-Month Mean Daily Streamflow Forecasts Apalachicola Watershed Southeast River Forecast Center

July 10th – August 10th 2016

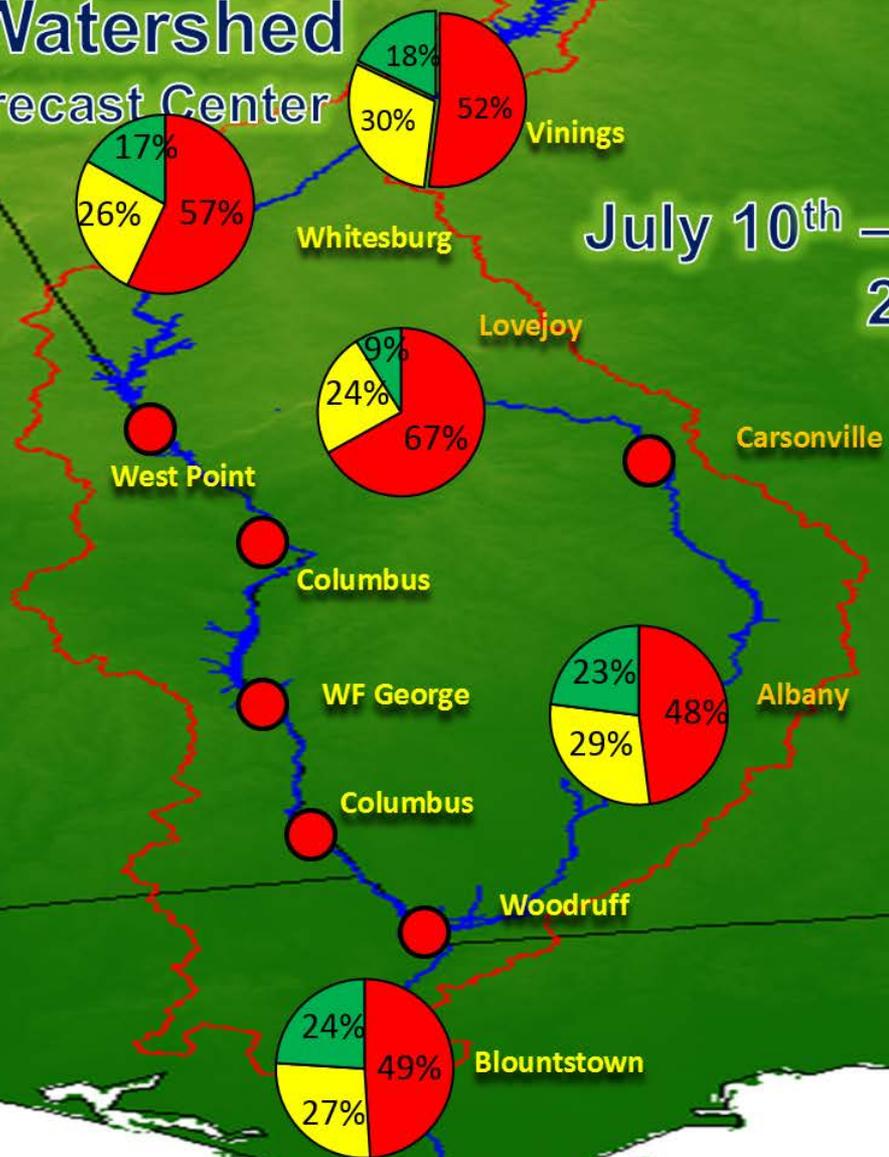
-  Above Normal
-  Near Normal
-  Below Normal



3-Month Mean Daily Streamflow Forecasts Apalachicola Watershed Southeast River Forecast Center

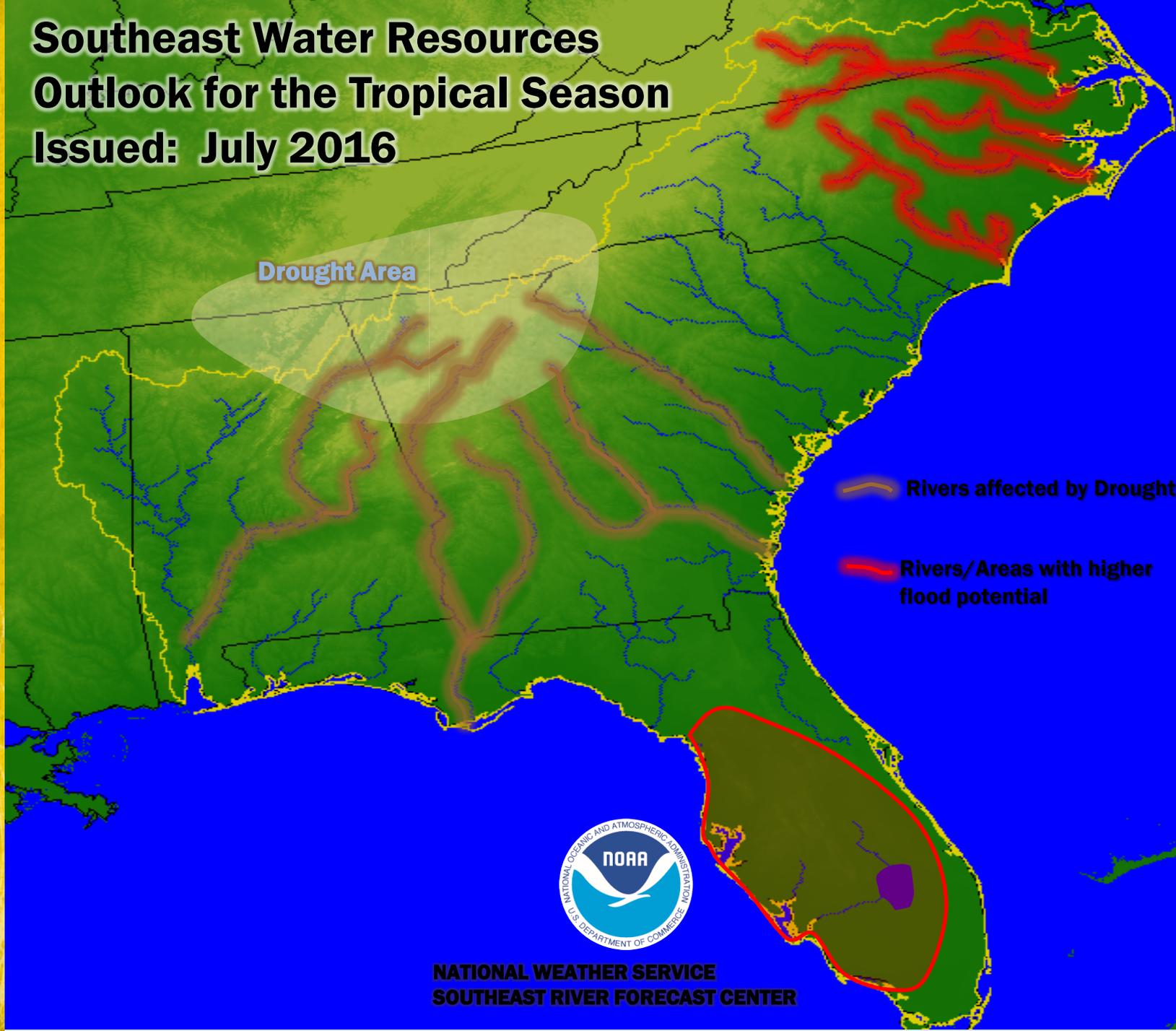
July 10th – October 10th
2016

-  Above Normal
-  Near Normal
-  Below Normal



Southeast Water Resources Outlook for the Tropical Season

Issued: July 2016



**NATIONAL WEATHER SERVICE
SOUTHEAST RIVER FORECAST CENTER**

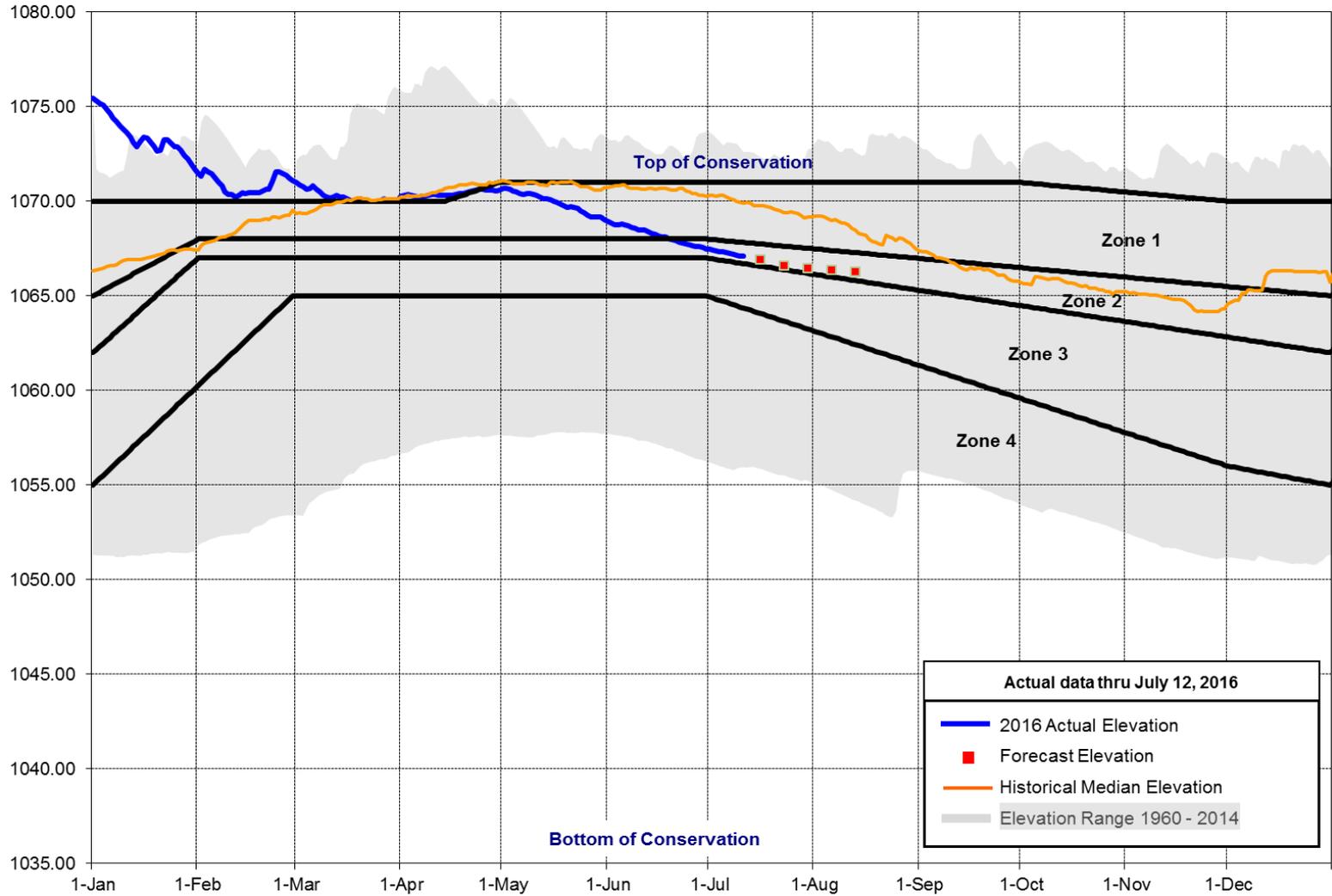
USACE – ACF Reservoir Conditions July 2016



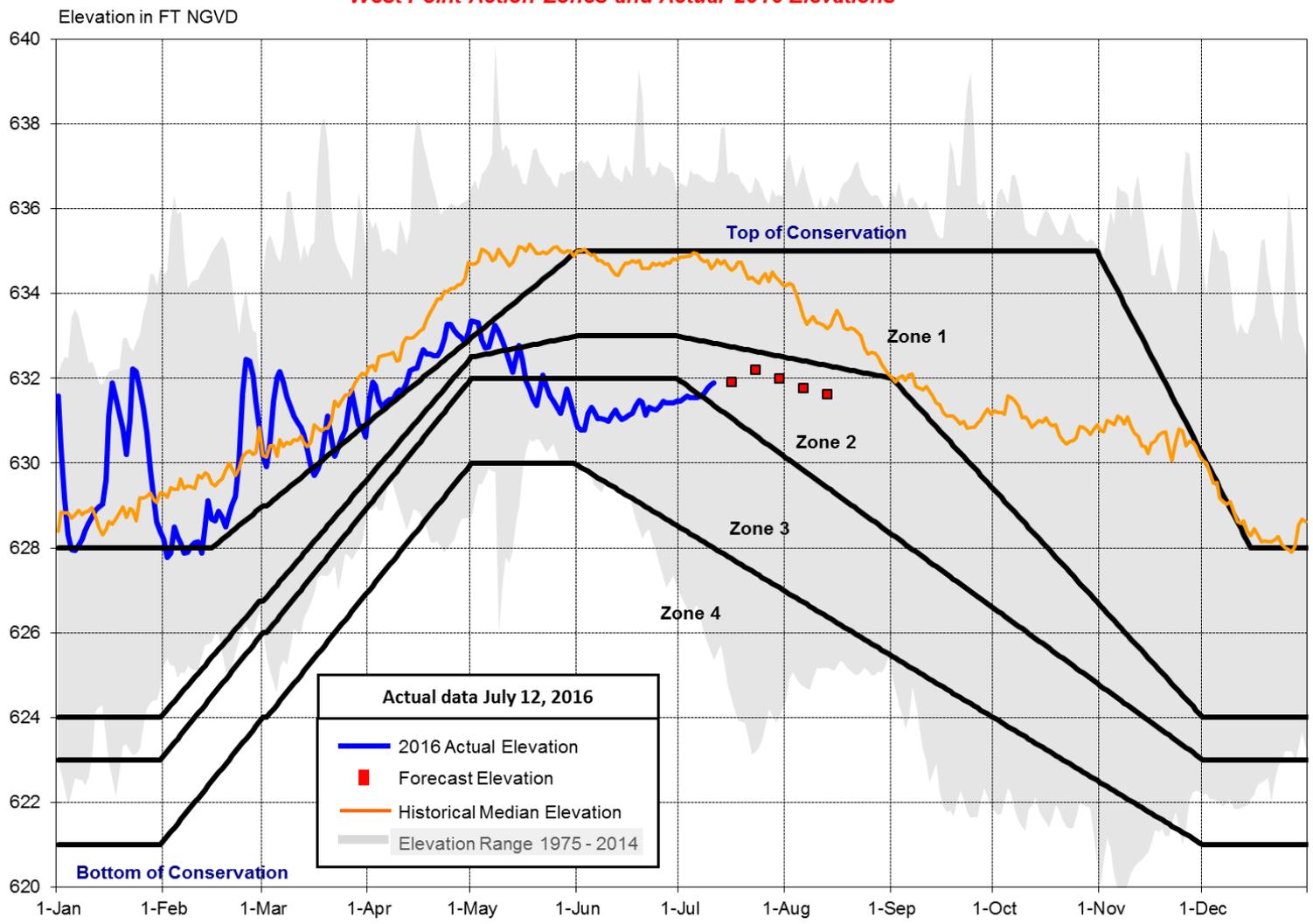
Cynthia Donald

Elevation in FT NGVD

Lanier Action Zones and Actual 2016 Elevations

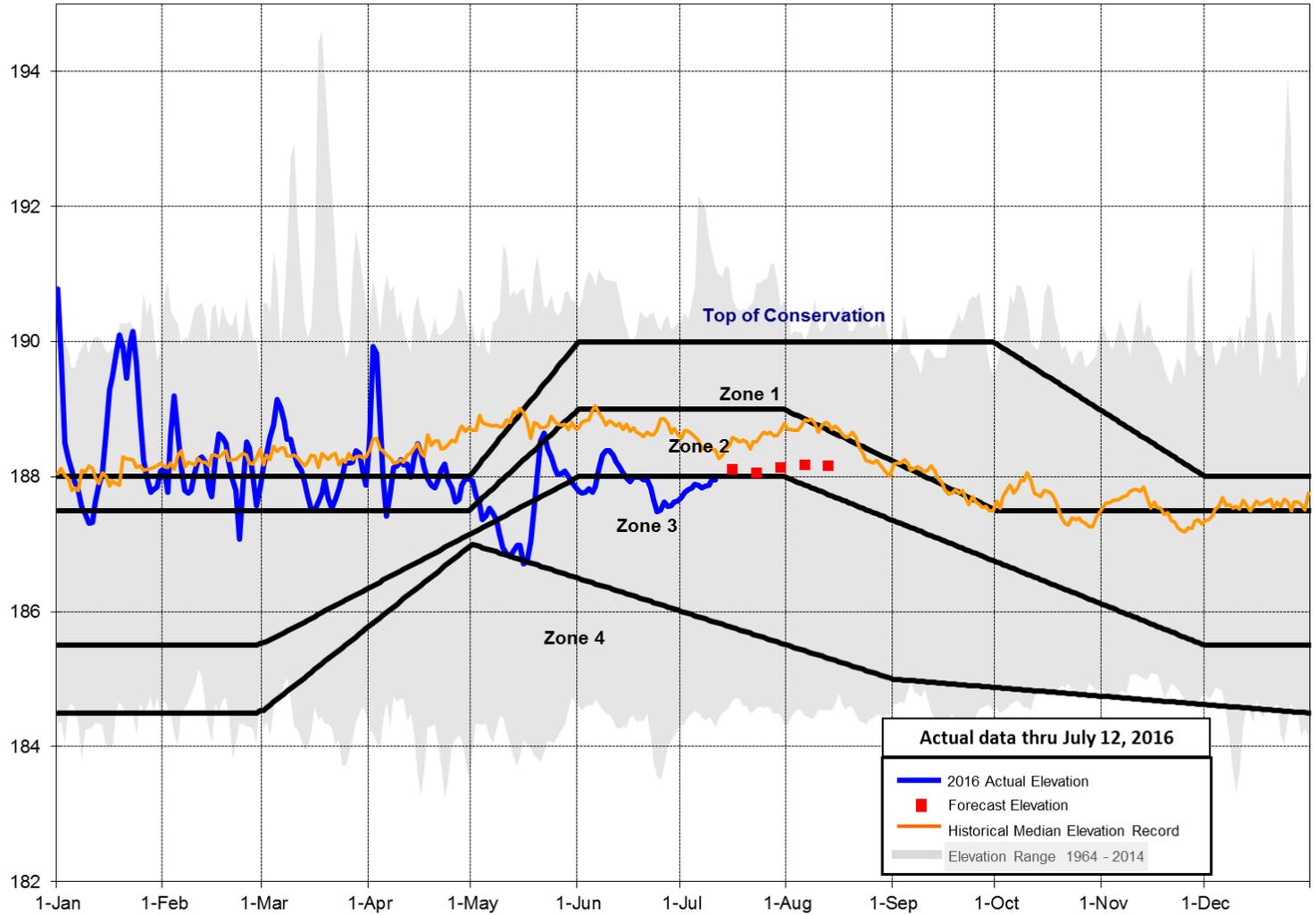


West Point Action Zones and Actual 2016 Elevations



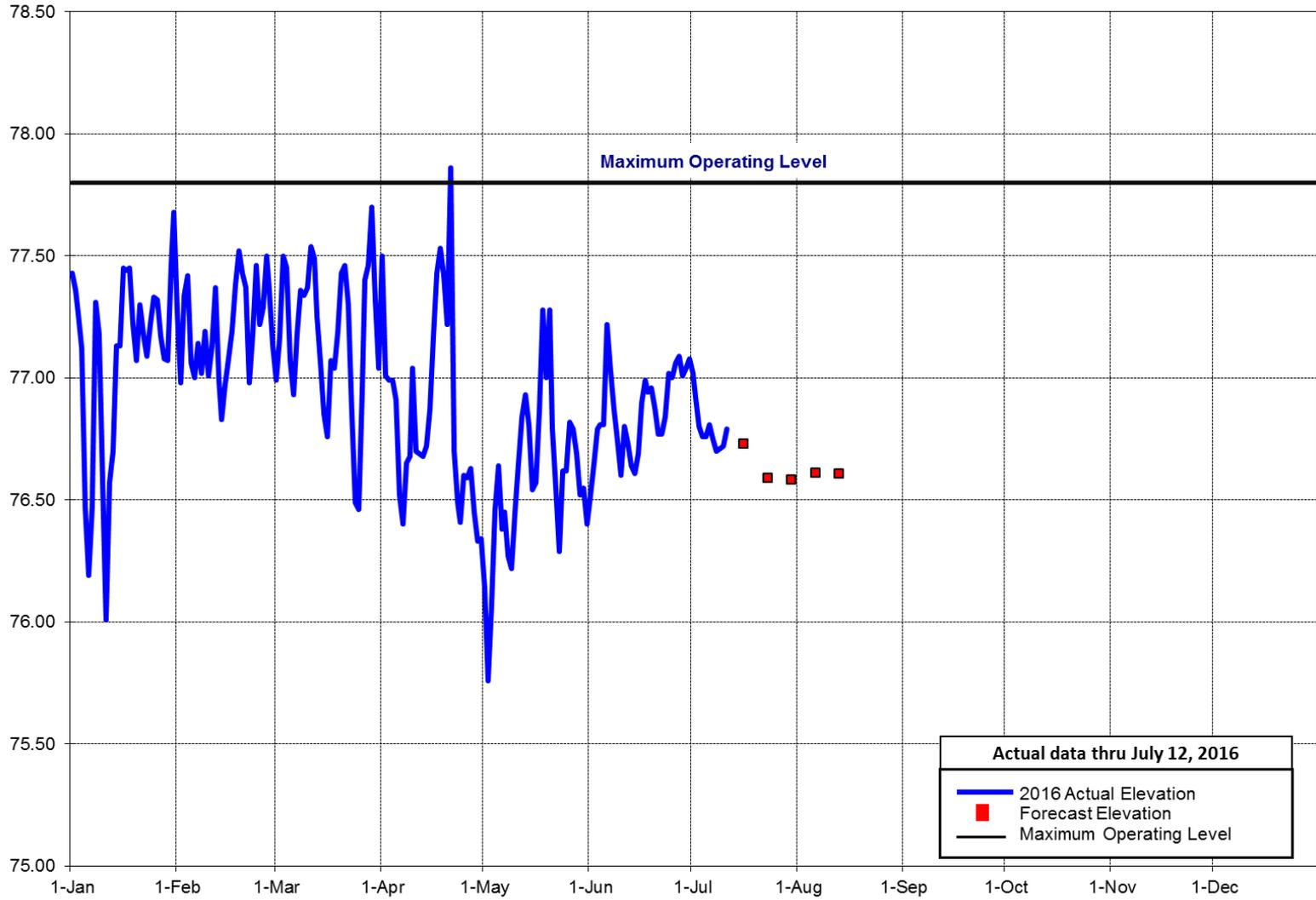
Elevation in FT NGVD

W.F. George Action Zones and Actual 2016 Elevations



Elevation in FT NGVD

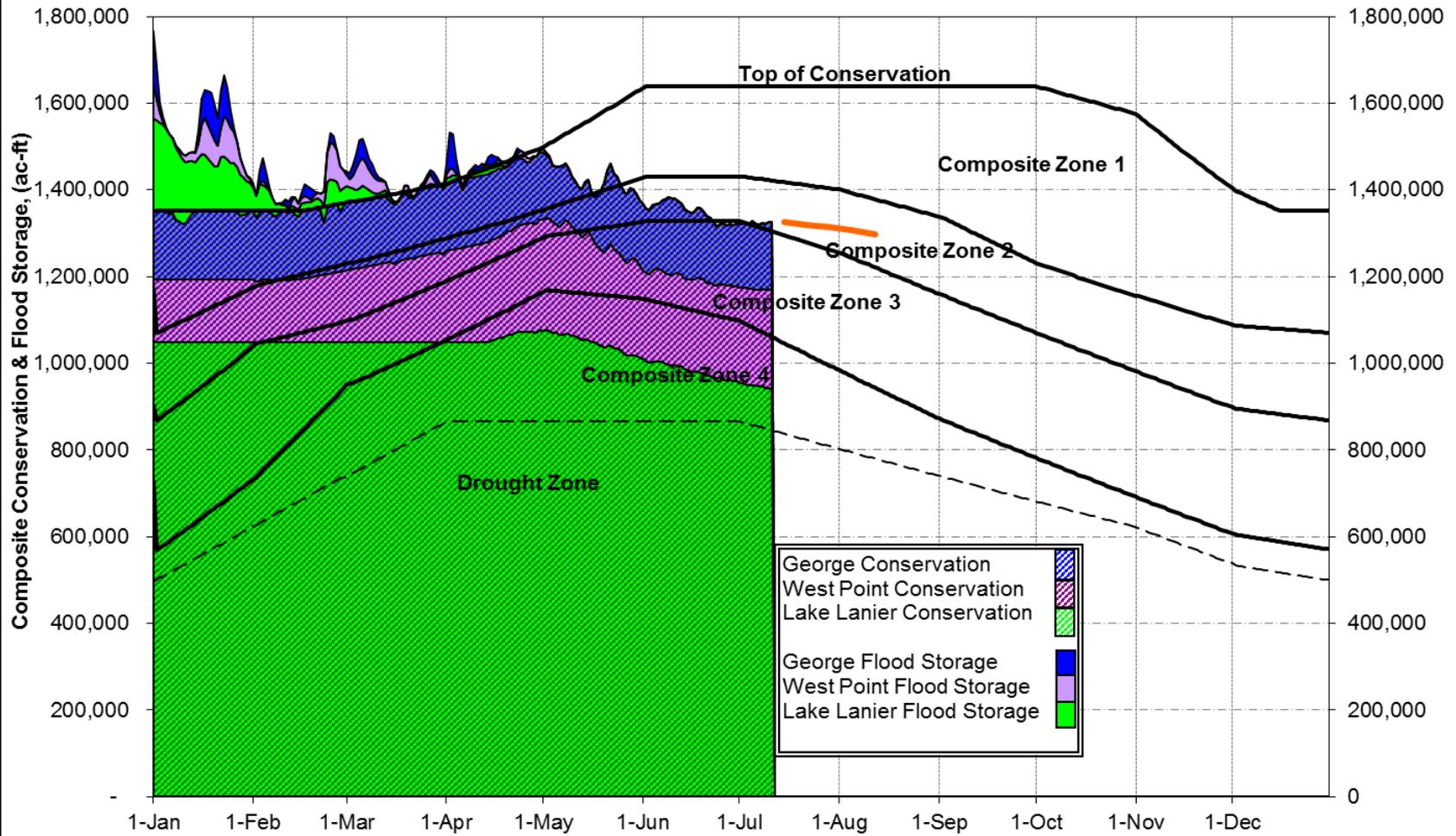
Jim Woodruff Actual & Projected 2016 Elevations



Actual data thru July 12, 2016

- 2016 Actual Elevation
- Forecast Elevation
- Maximum Operating Level

2016 ACF Basin Composite Conservation and Flood Storage



Actual data thru 7-12-2016

Add value of 1,856,000 acre-ft to include inactive storage.

Alabama Drought Declaration



Release Date: July 7, 2016



For Public Dissemination Alabama Drought Declaration

In accordance with the Alabama Drought Planning and Response Act (Code of Ala. 1975, §9-10C-1, et seq.) and the Alabama Drought Management Plan, the ADECA Office of Water Resources (OWR), based on a review of current and anticipated conditions, has declared the following portions of Alabama to be under the specified drought declaration levels.

Declaration Level

Emergency None

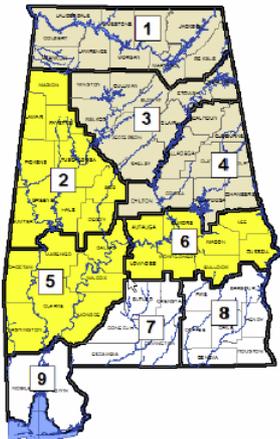
Warning None

Watch **Regions 1, 3, and 4 in the Alabama Drought Management Plan which includes the counties of:** Blount, Calhoun, Chambers, Cherokee, Chilton, Clay, Cleburne, Colbert, Coosa, Cullman, DeKalb, Etowah, Franklin, Jackson, Jefferson, Lauderdale, Lawrence, Limestone, Madison, Marshall, Morgan, Randolph, Shelby, St. Clair, Talladega, Tallapoosa, Walker, and Winston

Advisory **Regions 2, 5, and 6 in the Alabama Drought Management Plan which includes the counties of:** Autauga, Bibb, Bullock, Choctaw, Clarke, Dallas, Elmore, Fayette, Greene, Hale, Lamar, Lee, Lowndes, Macon, Marengo, Marion, Monroe, Montgomery, Perry, Pickens, Russell, Sumter, Tuscaloosa, Washington, and Wilcox

None **Regions 7, 8, and 9 in the Alabama Drought Management Plan which includes the counties of:** Baldwin, Barbour, Butler, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Mobile, and Pike

Current Alabama Drought Declaration



Legend	
No Drought Declaration	(White)
Advisory	(Yellow)
Watch	(Light Yellow)
Warning	(Orange)
Emergency	(Red)

After a relatively wet winter, dry conditions are returning to Alabama. Rainfall and streamflows have been below normal in many areas of the state, although sporadic and widely isolated thunderstorms continue to occur. Public water systems and other non-public and private water users should use this opportunity to review drought and contingency plans. The OWR will continue to monitor conditions and provide updated notifications as needed.

For further information, please visit our web site at <http://water.alabama.gov> and follow the links to the Office of Water Resources. You may also reach our office at (334) 242-5499, fax at (334) 242-0776, or e-mail at water@adeca.alabama.gov.



Water 



GriDSSAT

A gridded model that enables near real-time crop monitoring



Agriculture

Southeastern Irrigation

Lee Ellenburg

GriDSSAT

Through a NASA funded program, we developed a large scale spatial crop model based on satellite and other meteorological inputs to assist partners analyzing drought and crop health.

- Temperature from NASA's Land Surface Modeling System
- Solar insolation from NASA/UAH GOES physical retrieval method
- Precipitation from the NOAA NCEP Stage IV product



We are utilizing the crop model called “Decision Support System for Agrotechnology Transfer” (DSSAT)

DSSAT is run on a ~5-km grid for part of the Southeast (we call it “GriDSSAT”)

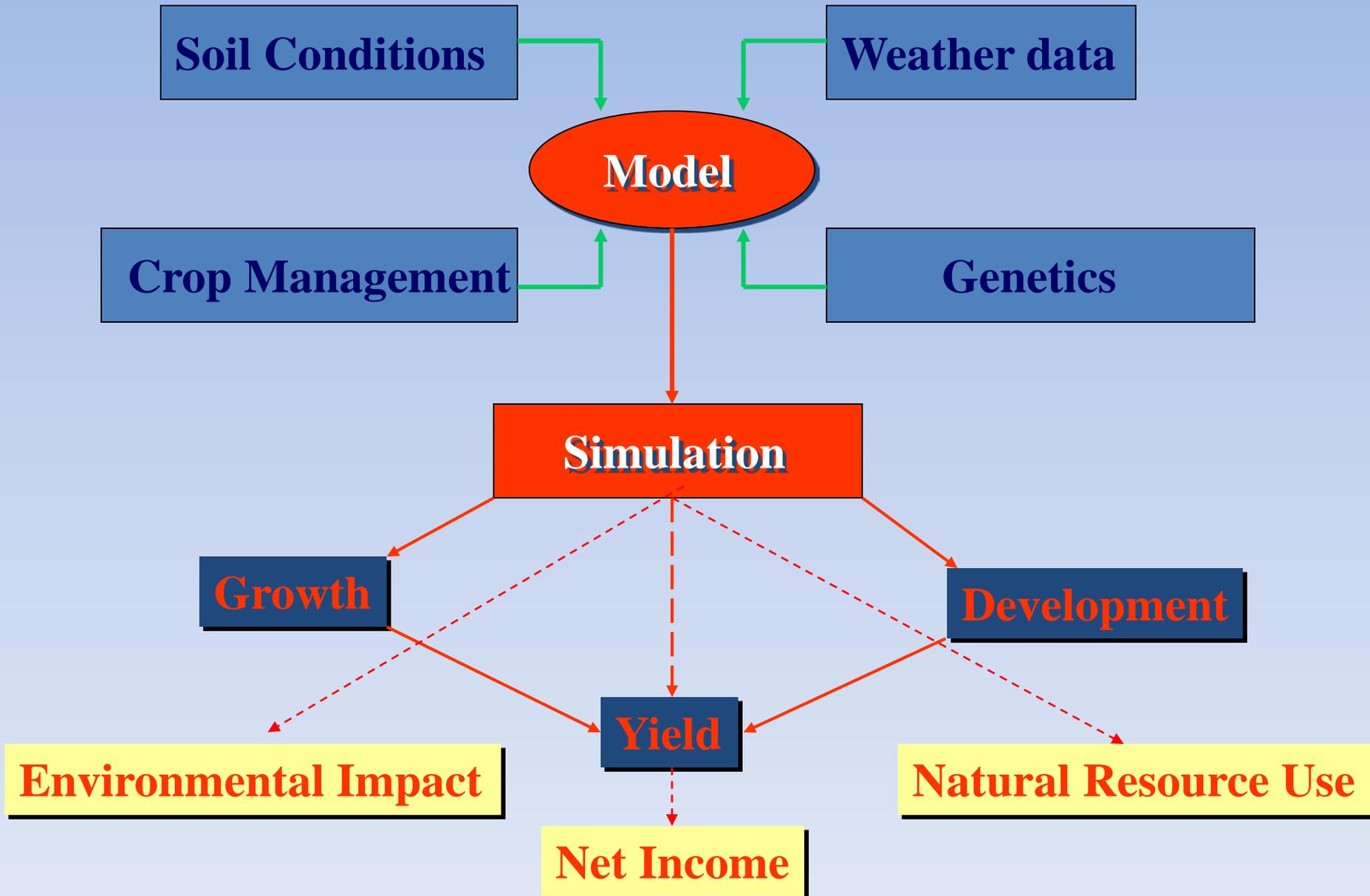
The model uses:

gSSURGO soil (3 dominate soils per grid cell)

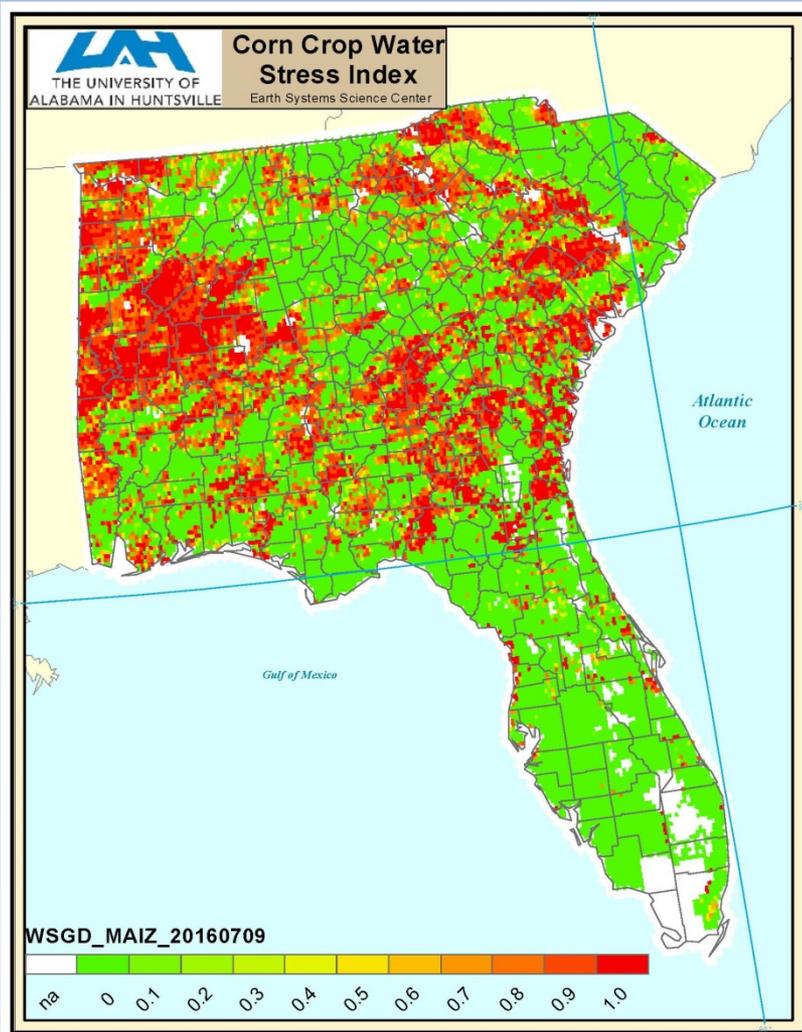
Corn cultivar

A latitude-dependent planting date

Crop Model



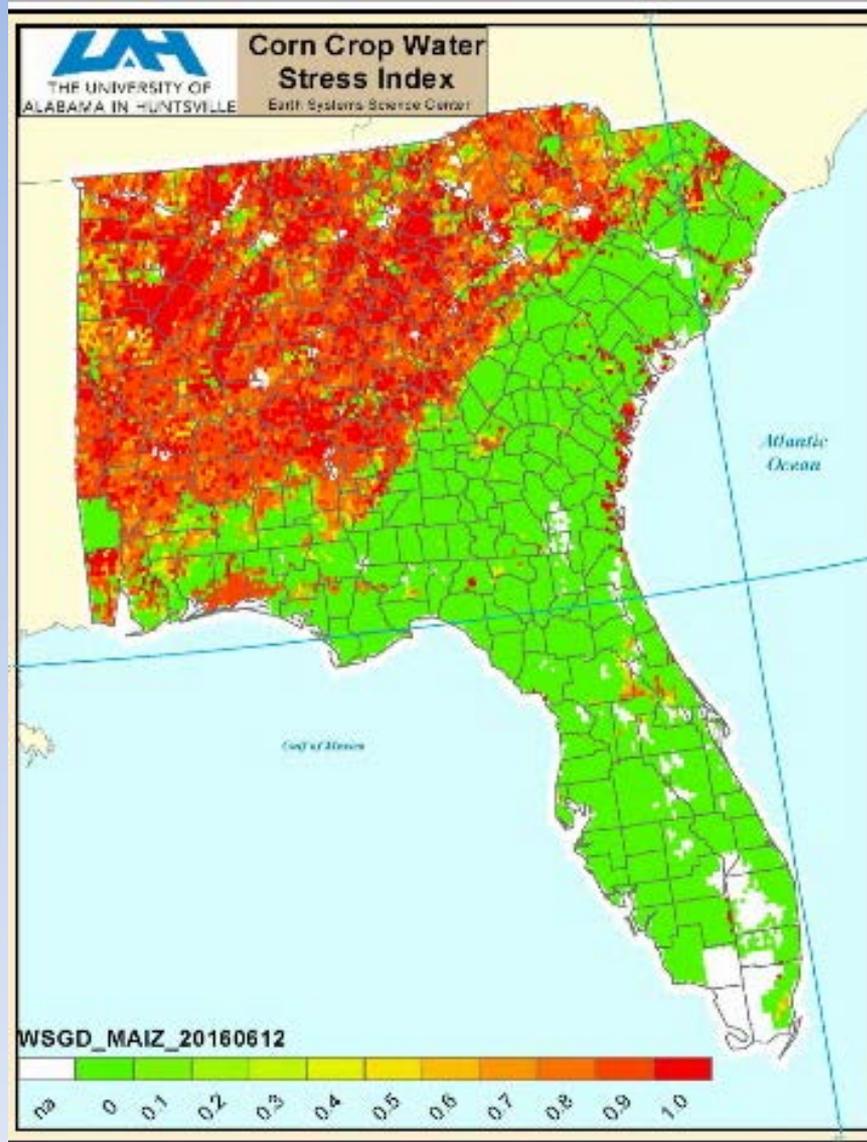
GriDSSAT Model Products



Crop Model Water Stress Index

- Models the plant's water budget from the root zone dynamics to transpiration
- Attempts to quantify lack of water on the plant physiological process as a ratio of potential uptake to potential transpiration
- The crop water stress index can be a more direct and valid measure of agricultural harm due to drought

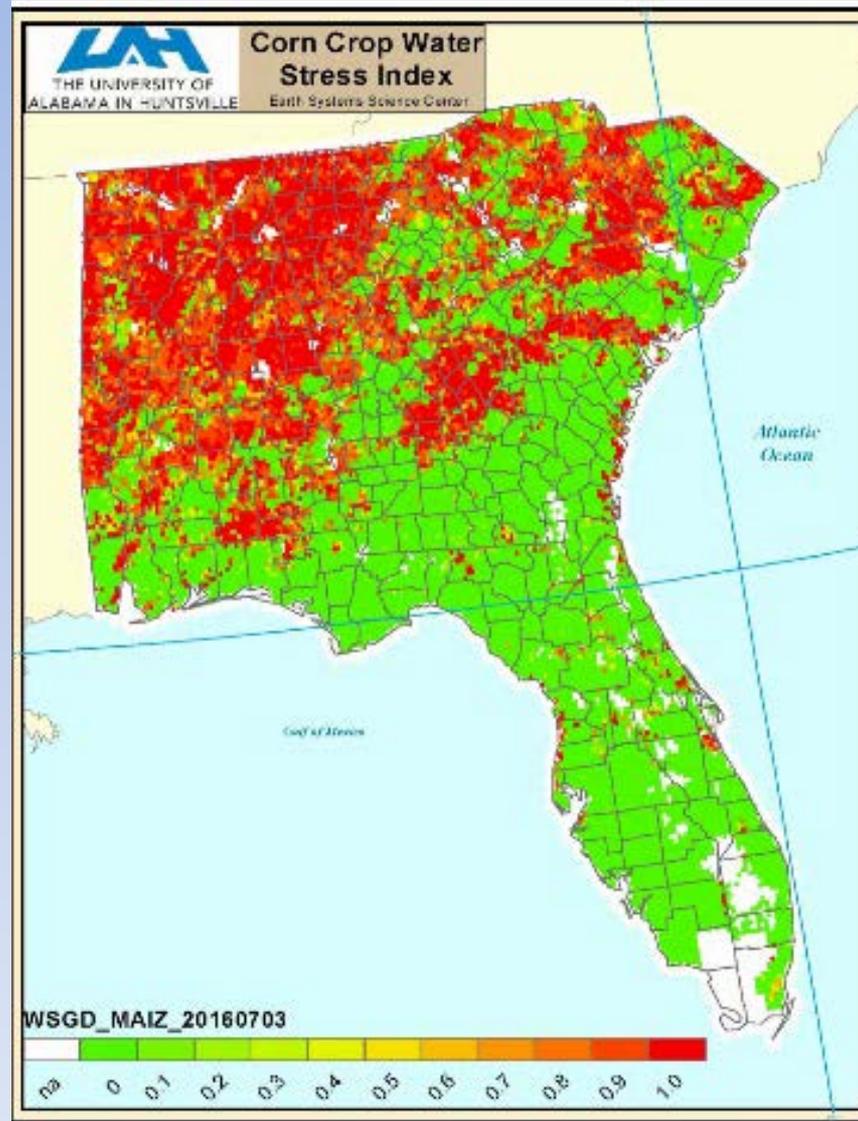
GriDSSAT Water Stress Index



Surrogate crop:
Corn

[Click here for animation](#)

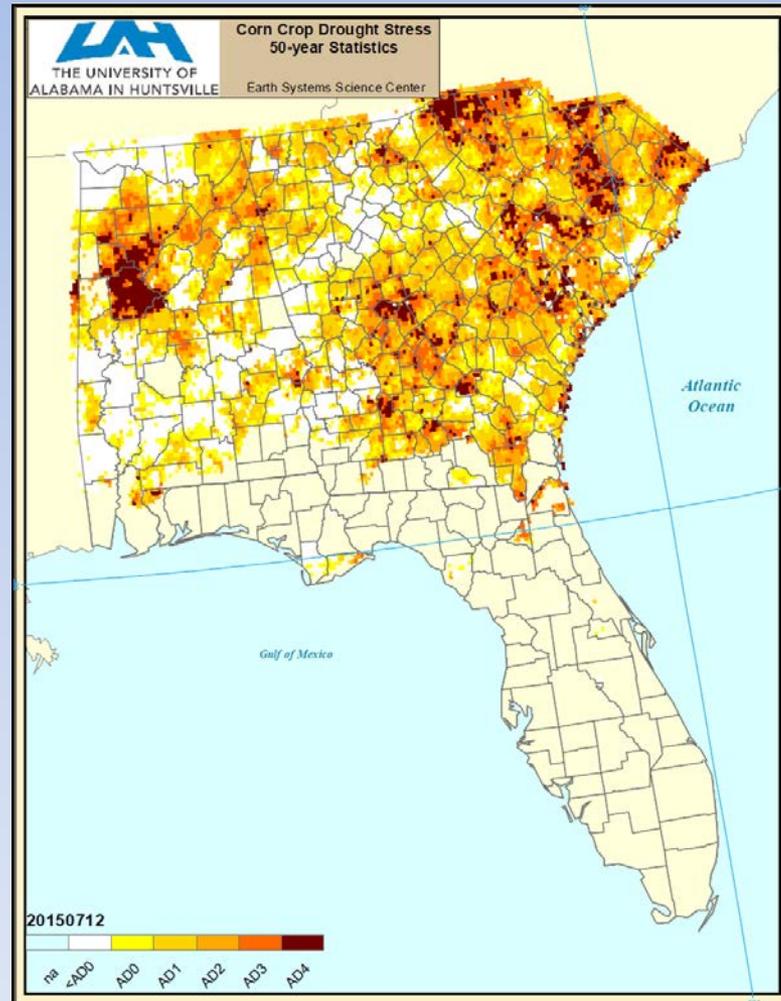
GriDSSAT Water Stress Index



Surrogate crop:
Corn

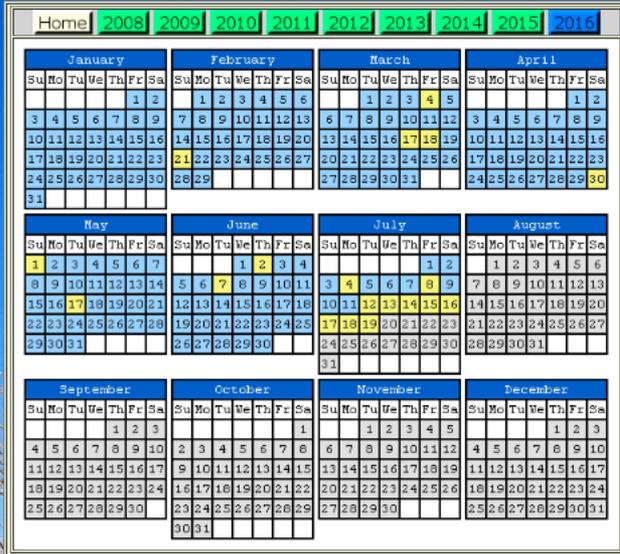
[Click here for animation](#)

Crop Model Drought Statistics (Hopefully in August)



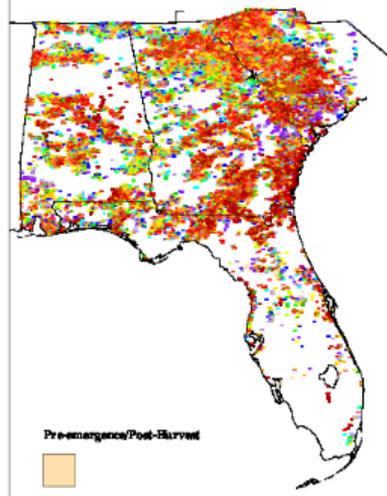
Daily drought products published online

GridSSAT Crop Model



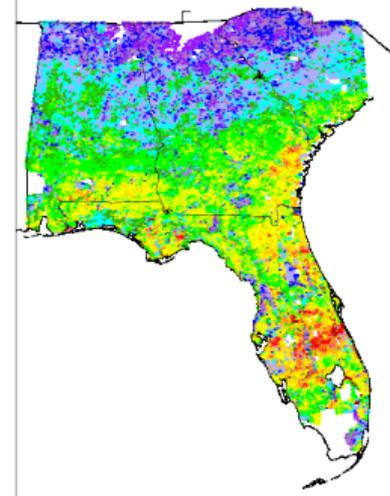
<http://gridssat.nsstc.uah.edu/>

Model Water Stress for the 24 Hours Ending at 1200 UTC 11 Jul 2016



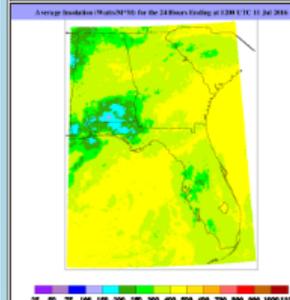
0.01 0.10 0.20 0.30 0.40 0.50 0.55 0.60 0.65 0.70 0.75 0.80 0.85 0.90 0.95 1.00

Crop Model Yield (Bushels/Acre) 11 Jul 2016



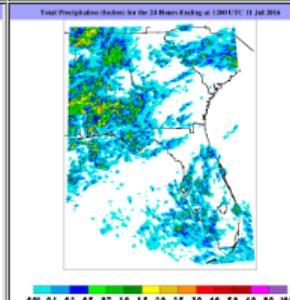
5 10 15 20 30 40 50 75 100 125 150 175 200 225 250 275

Average Insolation



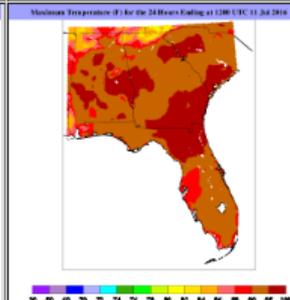
50 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500 525 550 575 600 625 650 675 700 725 750 775 800 825 850 875 900 925 950 975 1000

Total Precipitation



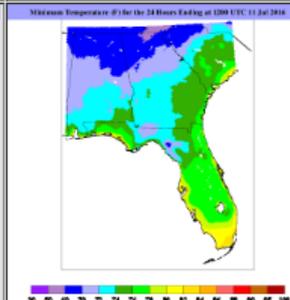
0.01 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8

Maximum Temperature



50 55 60 65 70 75 80 85 90 95

Minimum Temperature



50 55 60 65 70 75 80 85 90 95

ADROP

Alabama Power Company has issued a notice that below-average rainfall over the last few months is triggering the Alabama-ACT Drought Response Operating Plan (ADROP). Beginning Monday, June 27, flow releases from the Coosa and Tallapoosa Rivers into the Alabama River will be reduced by 10% from 4,640 cubic feet per second (cfs) to 4200 cfs.

"Rainfall over the Alabama River Basin has been below average for the last few months and in turn, the stream flows have been consistently low. The Alabama Power storage reservoirs (Weiss, Neely Henry, and Logan Martin) on the Coosa River system are approaching 1 ft below their summer pool elevations. The Tallapoosa River storage reservoirs (Harris and Martin) have started pulling off of their curves as we pick up flows out of that system.

As a part our drought plan, ADROP (Alabama-ACT Drought Response Operating Plan), we evaluate a set of triggers twice a month to see if a drought response is required. On the second evaluation for the month of June, the plan indicated a drought level 2 response. This drought response corresponds to a 10% flow reduction into the Alabama River. Beginning Monday, June 27th, in accordance with our plan, we will reduce the flows into the Alabama River from 4,640 cfs to 4,200 cfs.

Summary – David Zierden

- Warmest U.S. June on record, helping drive Southwest Wildfires
- Extreme and moderate drought has developed over N. Georgia, Northeast Alabama and the upper ACF
- Upper ACF basin showing substantial rainfall deficits at 30-90 days, middle basin below normal, lower basin near normal
- 7-day QPF forecast keeps heavier rain to the north of the ACF
- El Nino declared over, shift to La Nina likely (75%)
- NOAA one and three month forecast favor warmer than normal temperatures
- La Nina likely to enhance tropical activity this upcoming season over the last three seasons

Summary-Paul Ankcorn

- Realtime streamflows are in the below normal to much below normal range for most of the ACF basin.
- 28-day average streamflows into Lake Lanier are in the below normal range.
- 28-day average streamflows for the Chattahoochee River below Lake Lanier are in the below normal to much below normal range.
- 28-day average streamflows for the Flint River are in the below normal range.
- Groundwater levels are in the normal range in Southwest Georgia.

Summary-Todd Hamill

- 1 Month Streamflow forecast - Below Normal, Flint hovering between near to below
- 3 Month Streamflow forecast – Below Normal
- Pie Charts do not directly include any adjustments to the ESP forecast based on ENSO, CPC or other. Based on soil conditions relative to normal in concert with historical precipitation.

Summary – Cynthia Donald

- Things are still dry and reservoir levels are below normal for this time of year.
- System conservation storage has crossed back just above Zone 2.
- We are forecasting the system conservation storage to remain in Zone 2 for the next couple of weeks.

Questions, Comments, Discussion

References

Speakers

David Zierden, FSU

Paul Ankcorn, USGS

Todd Hamill, SERFC

Cynthia Donald, USACE

Tom Littlepage, OWR-ADECA

Lee Ellenburg, ESSC-UAH

Moderator

Eric Reutebuch, AU WRC

Additional information

- General drought information

<http://drought.gov>

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

- General climate and El Niño information

<http://agroclimate.org/climate/>

- Streamflow monitoring & forecasting

<http://waterwatch.usgs.gov>

<http://www.srh.noaa.gov/serfc/>

- Groundwater monitoring

<http://groundwaterwatch.usgs.gov>

Thank you!

Next briefing

August 16, 2016, 1:00 pm EDT

Moderator: Eric Reutebuch

Slides from this briefing will be posted at

<http://drought.gov/drought/content/regional-programs/regional-drought-webinars>

Please send comments and suggestions to:

reuteem@auburn.edu