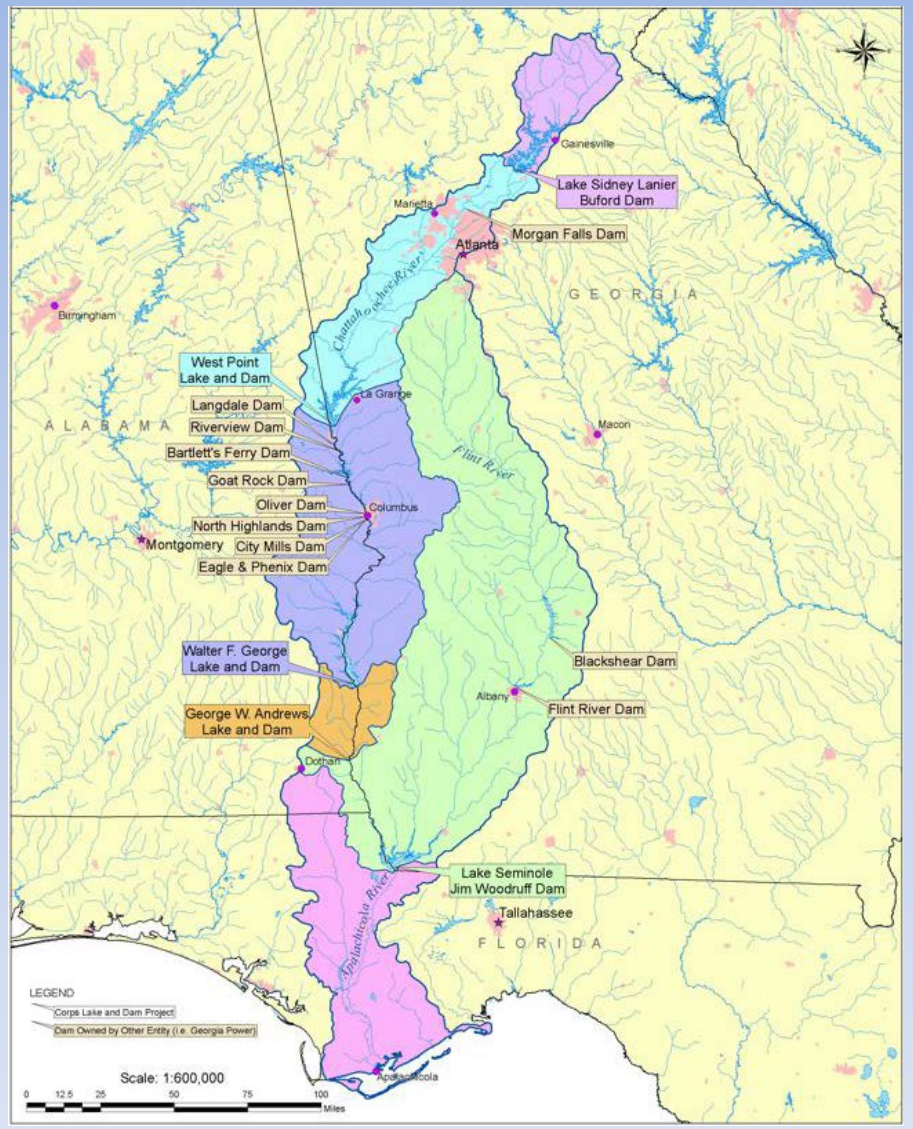
National Integrated Drought Information System

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

16 February 2016

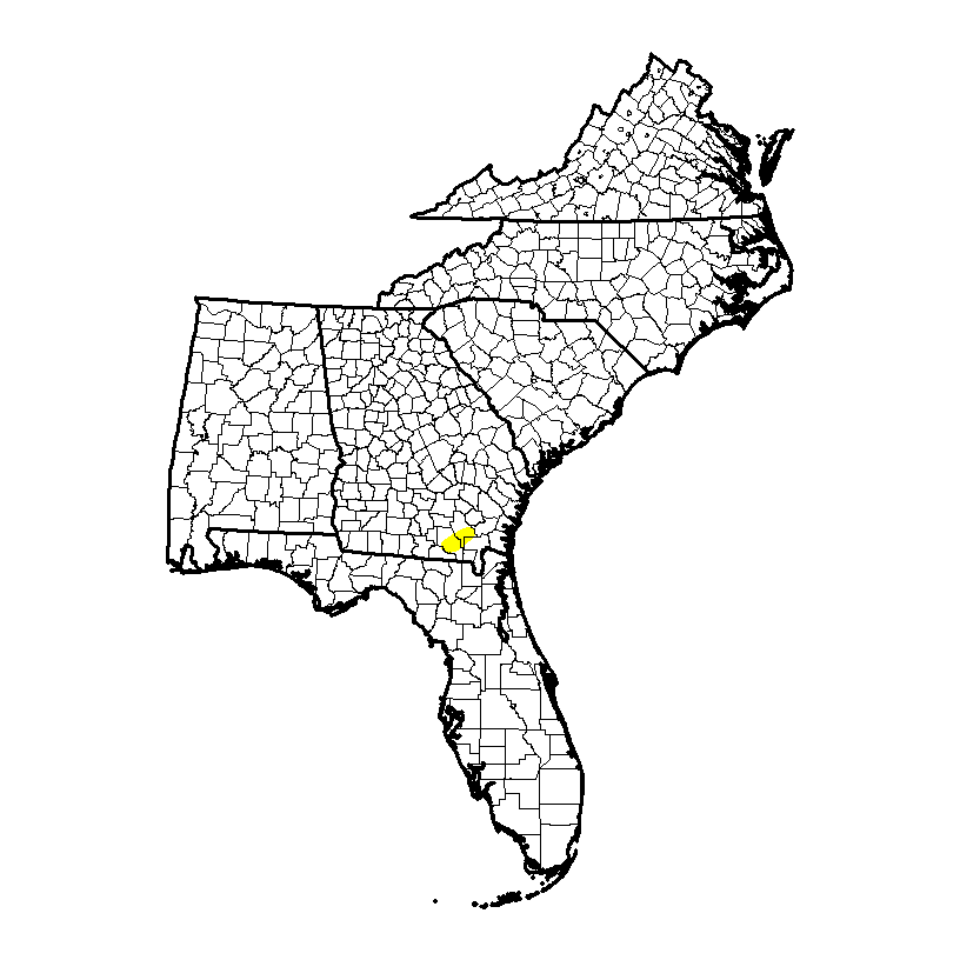


Outline

Welcome – Eric Reutebuch, AU Water Resources Center

- Current drought status, seasonal forecasts and outlooks – David Zierden, Florida Climate Center, FSU
- Streamflows and groundwater – Paul Ankcorn, USGS
- Streamflow forecasts – Jeff Dobur, SERFC
- ACF reservoir conditions – Bailey Crane, United States Army Corps of Engineers
- Summary and Discussion

Current drought status

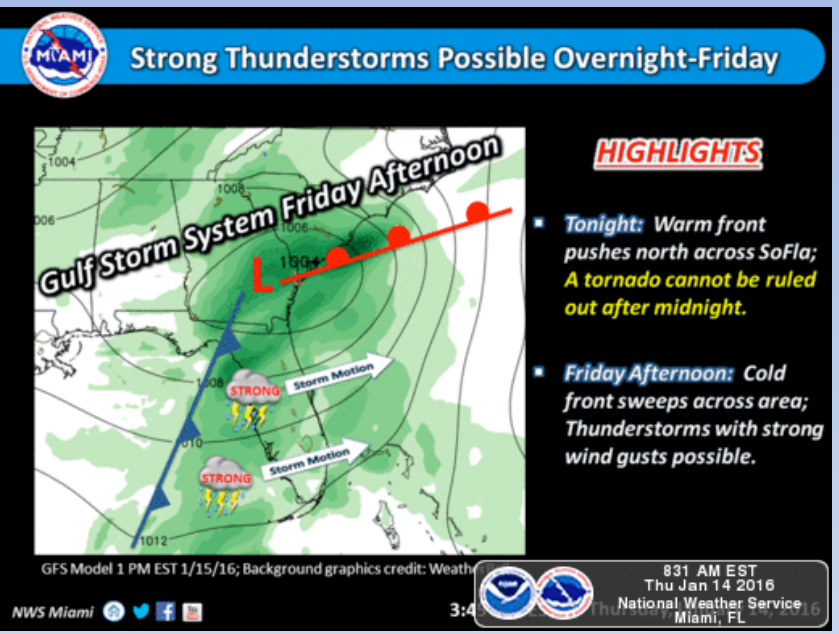


Intensity:

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

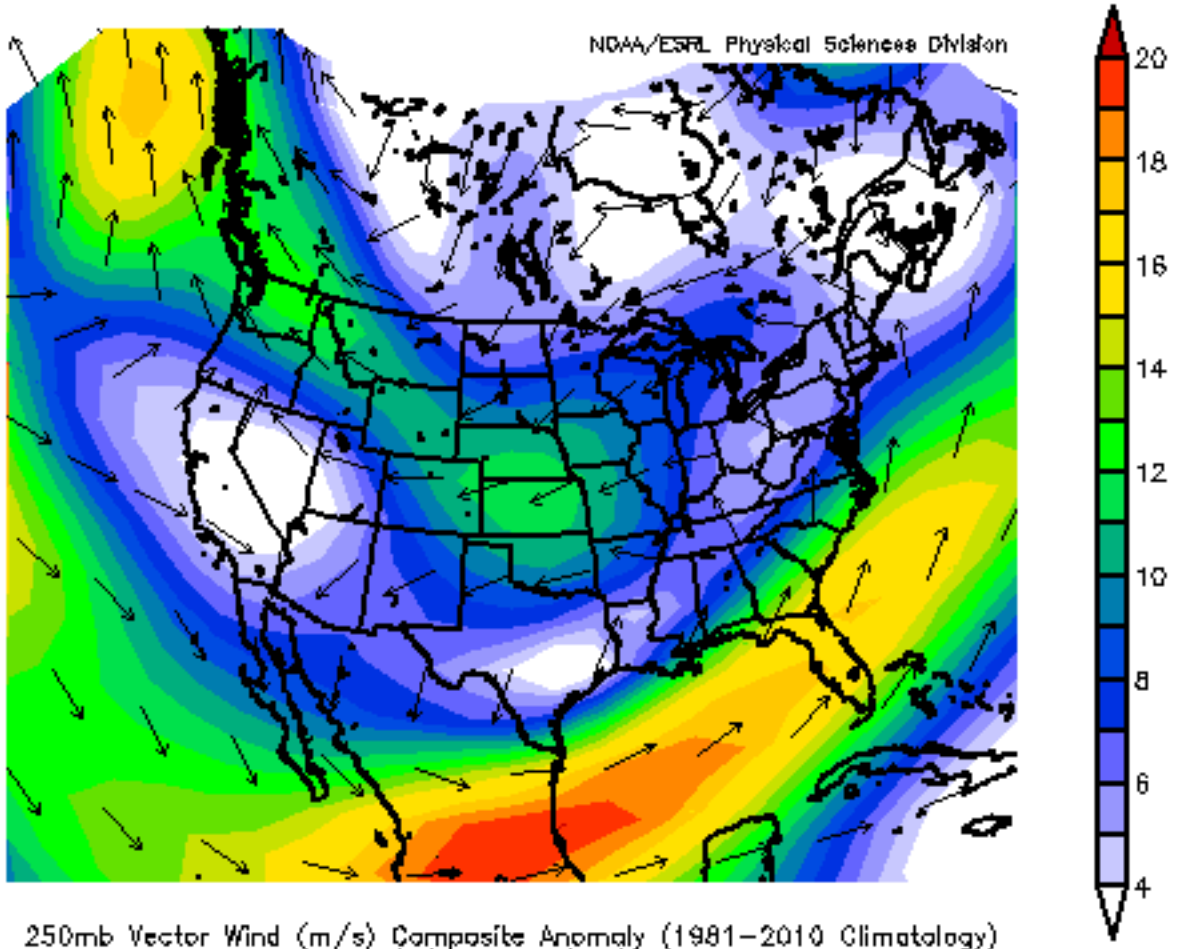
*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying **text summary** for forecast statements.*

El Nino on Track in 2016



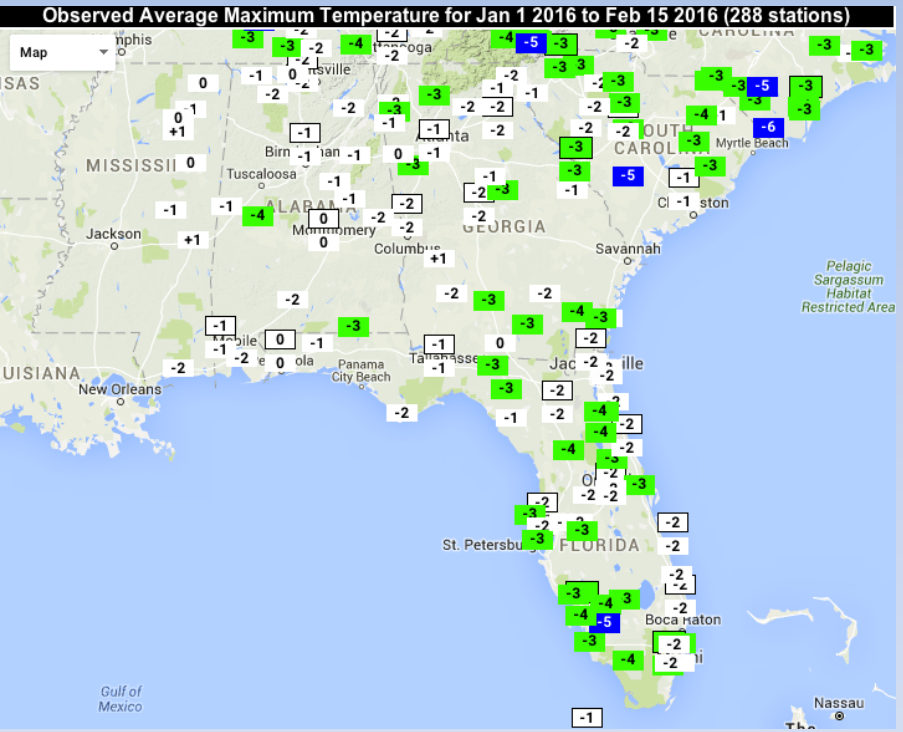
- Gulf low pressure systems impacting the area on Jan. 15th, 17th, the 21-22nd, the 27-28th, Feb. 3-4th.
- Three EF-2 intensity tornadoes thus far in South Florida in 2016, numerous other EF-1's
- Strong subtropical jet has been a consistent feature

Subtropical Jet

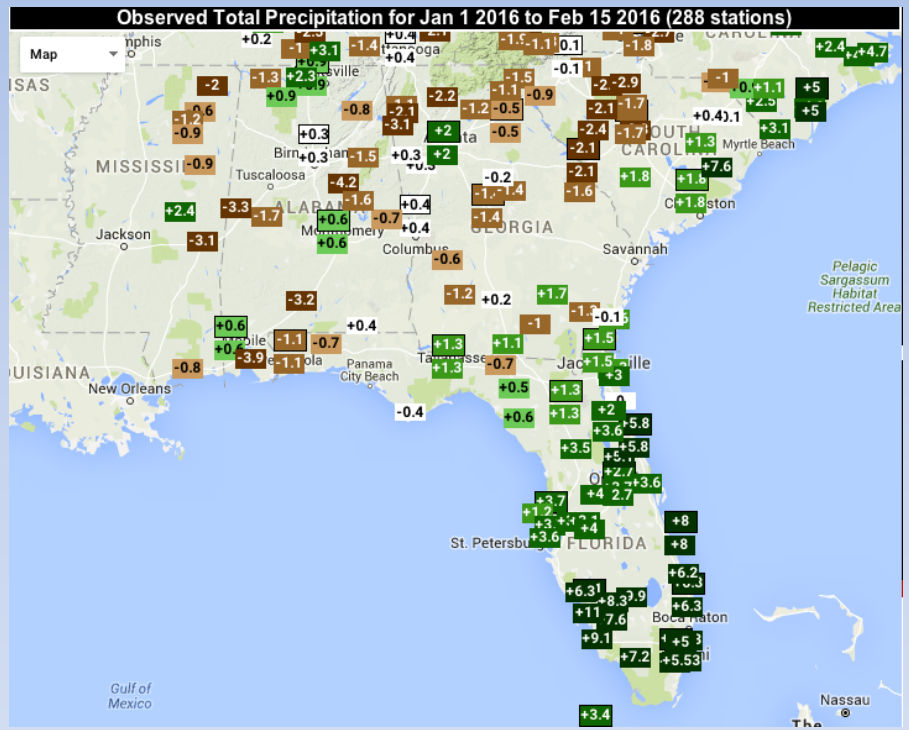


Year to Date Temp. and Rainfall Departures from Normal

Max. Temperature



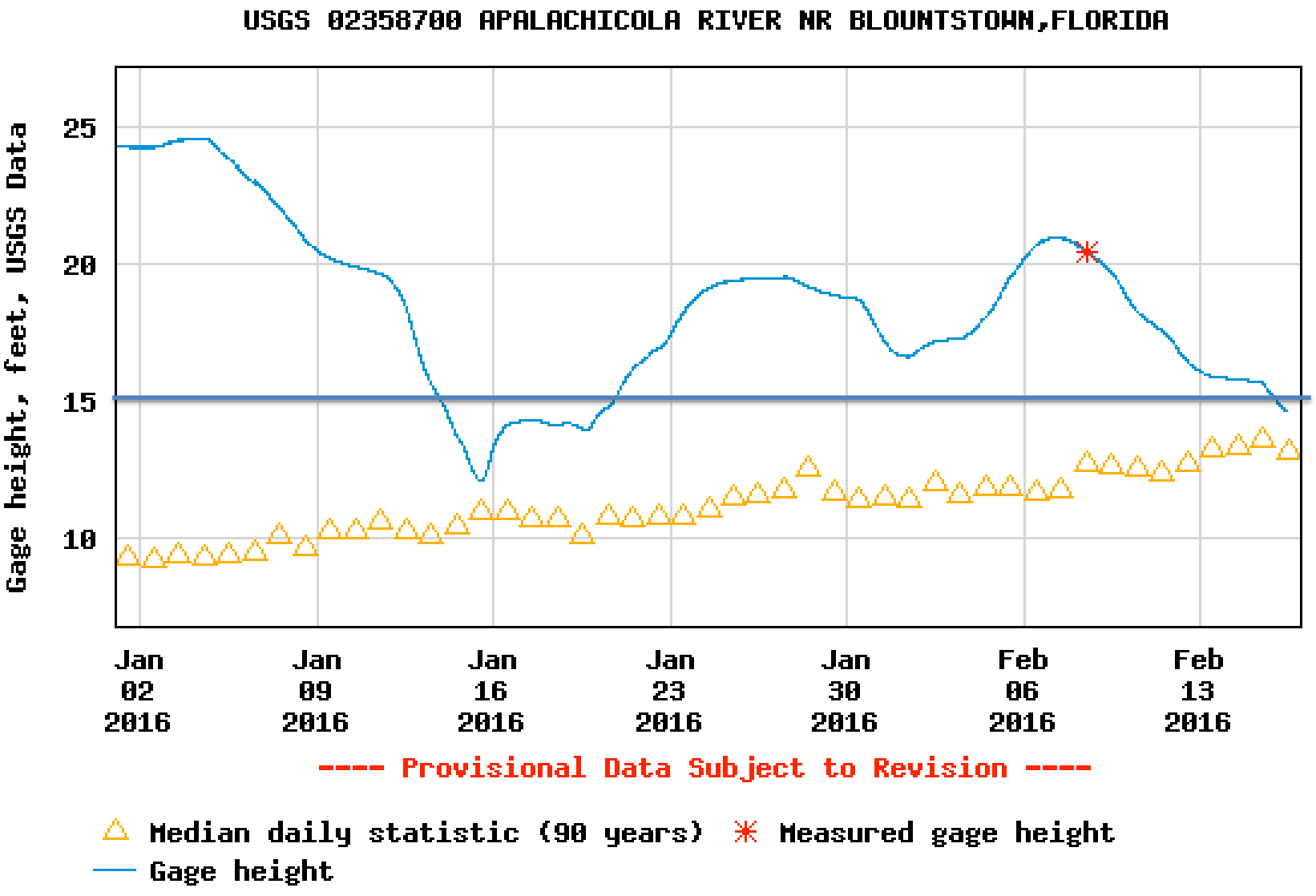
Rainfall



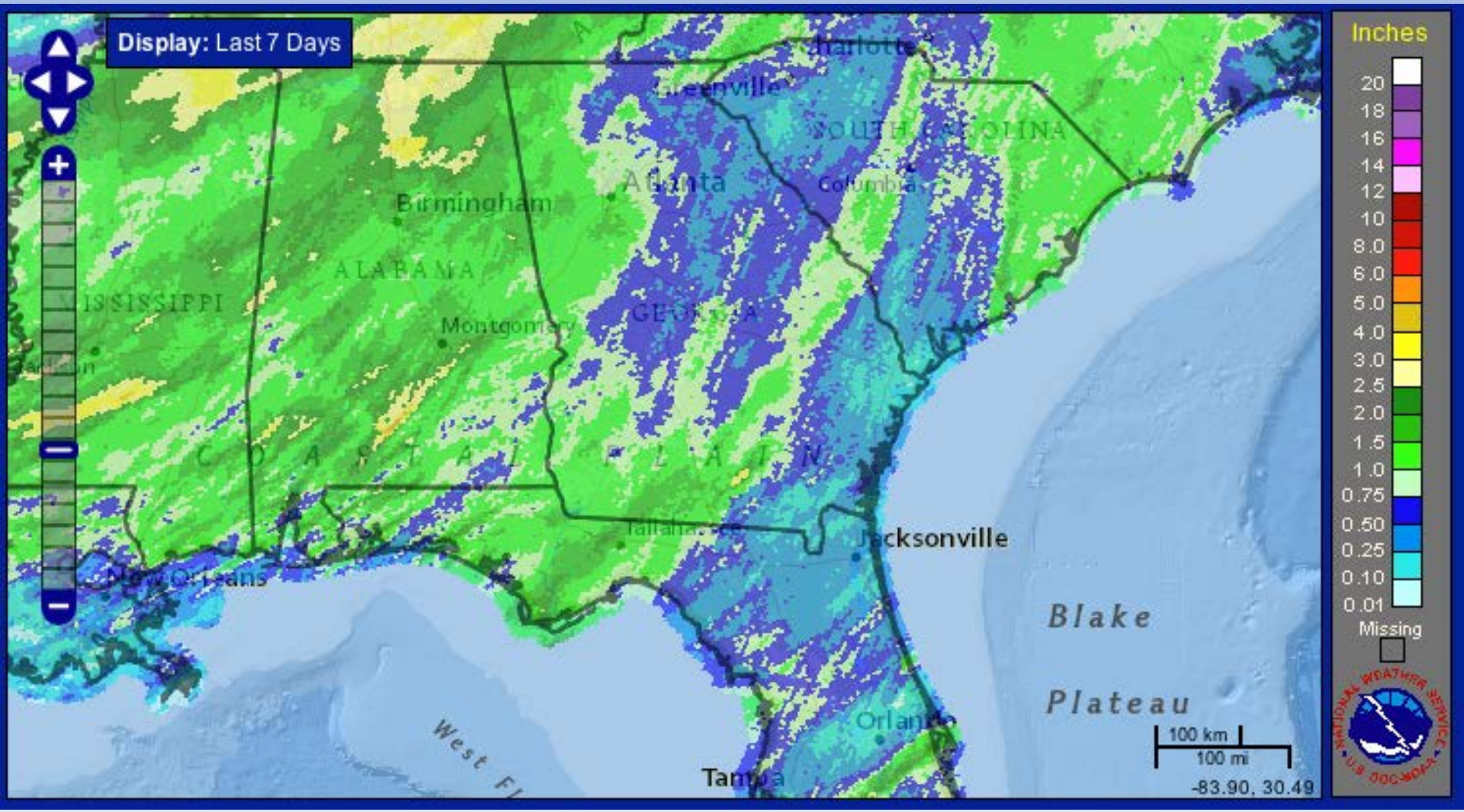
			DJF (Dec-Jan-Feb) Rainfall Totals During Strongest El Niño's						
			Wettest			2nd Wettest		3rd Wettest	
State	Station Name - POR Start	DJF Period of Record Rainfall Average	1957-1958	1965-1966	1972-1973	1982-1983	1991-1992	1997-1998	2015-2016 as of 2/9
Alabama	Huntsville(HSV) - 1894	14.87	11.44	9.98	17.79	14.3	17.98	17.99	16.52
	Muscle Shoals(MSL) - 1893	14.75	9.66	11.09	17.32	17.36	18.15	15.08	11.52
	Birmingham(BHM) - 1895	14.71	12.57	15.47	14.94	19.19	10.82	20.71	16.86
	Montgomery(MGM) - 1872	14.61	10.69	17.83	15.54	22.6	21.5	14.63	20.83
	Tuscaloosa(TCL) - 1948	14.64	9.47	16.37	15.55	26.51	12.58		13.76
	Mobile(MOB) - 1871	14.94	13.76	18.5	10.95	25.95	22.92	25.58	19.85
Florida	Pensacola(PNS) - 1879	13.47	12.16	21.14	13.89	23.72	16.63	21.03	13.86
	Tallahassee(TLH) -1896	13.15	8.72	23.95	16.97	16.15	14.52	15.27	11.78
	Jacksonville(JAX) - 1871	8.83	8.44	14.28	11.14	13.48	9	24.38	7.01
	Gainesville(GNV) - 1890	9.44	8.77	14.65	12.64	9.65	9.66	24.88	8.3
	Daytona Beach(DAB) - 1923	7.4	10.01	10.61	9.16	11	5.64	19.34	10.47
	Orlando(MCO) -1892	6.89	10.17	12.99	9.44	11.41	4.01	23.36	7.04
	Vero Beach(VRB) - 1942	7.01	10.64	11.98	9.43	16.73	5.7	17.23	15.62
	Tampa(TPA) -1890	7.16	11.32	9.47	8.45	9.89	5.81	31.03	7.98
	Fort Myers(FMY) -1902	5.26	10.85	5.3	6.8	15.59	5.94		17.66
	NAPLES COOP	5.39	11.18	6.65	4.19	14.07	4.55	13.89	17.51
	West Palm Beach(PBI) - 1888	8.29	11.34	14.86	7.41	21.24	9.39	22.43	18.12
	Miami(KMIA) -1895	5.9	10.05	11.15	9.8	14.61	3.47	12.93	18.83
	Key West(EYW) -1871	5.39	11.18	6.65	4.19	14.07	4.55	13.89	17.51
Georgia	Atlanta(ATL) -1878	13.7	12.84	14.68	19.95	13.31	10.21	17.98	19.78
	Athens(AHN) -1898	13.38	12.46	17.11	15.38	12.17	11.28	19.5	17.92
	Columbus(CSG) -1948	13.54	8.47	19.07	19.96	18.44	15.06	14.36	22.96
	Macon(MCN) - 1892	12.48	10.58	16.9	22.2	20.74	14.1	19.23	17.35
	Brunswick(SSI) -1948	8.98	7.45	17.28	8.75	14.72	8.78	22.98	7.89
	Alma(AMG) -1948	10.97	8.23	16.02	14.76	17.33	13.61	21.31	9.92
	Savannah(SAV) -1871	8.88	7.68	12.7	10.84	14.76	10.59	18.37	9.55
	Augusta(AGS) -1873	11.16	10.33	13.53	15.67	15.42	11.6	20.8	10.72
PR/USVI	San Juan(JSJ) -1898	11.36	12.53	8.03	10.72	5.65	7.93	12.03	6.44
	St. Croix(ISX) - 1951	6.87	10.07		8.68	5.2	5.62	3.96	3.03
	St. Thomas(IST) -1953	6.53	11.92		7.55	8.95	5.74		5.9
North Carolina	Cape Hatteras(HSE) - 1874	12.67	13.81	15.55	13.58	23.56	13.11	23.1	15.7
	New Bern(EWN) - 1948	11.08	12.61	14.27	12.41	18.56	11.63		16.09
	Raleigh(RDU) - 1887	10.13	10.09	10.43	13.18	11.81	8.68	16.03	9.43
	Piedmont Triad(GSO) - 1903	9.86	8.72	10.56	11.72	8.69	9.36	13.44	9.56
	Wilmington(ILM) - 1871	10.19	11.87	12.67	14.51	20.21	11.37	23.34	16.1
	Lumberton(LBT)	7.69							12.1
	Mt. Mitchell -1980	18.69				20.94	20.42	34.8	25.74
	Hickory(HKY) -1949	11.17	11.41	11.54	17.05	13.86	11.97		11.96
	Asheville(AVL) -1869	9.57	9.28	10.09	12.38	13.06	11.6	19.32	14.47
	Charlotte(CLT) - 1878	11.09	9.81	9.81	14.41	12.26	10.58	13.64	11.73
South Carolina	Greenville/Spartanburg(GSP) -1884	12.87	11.76	11.79	15.89	12.98	11.52	17.95	15.24
	Columbia(CAE) - 1887	10.43	10.4	12.4	16.39	12.76	9.92	17.54	10.12
	Florence(FLO) - 1948	9.4	10.56	11.02	12.11	14.6	7.58	16.2	12.14
	Charleston(CHS) - 1938	9.63	14.81	12.49	14.52	15.41	8.78	22.94	9.87
	N. Myrtle Beach(CRE) - 1999	8.13							9.32
Virginia	Washington Dulles(IAD) -1962	8.53		8.54	11.15	7.39	8.93	13.18	9.51
	Washington Reagan(DCA) - 1871	9	12.27	7.99	9.49	6.52	10.08	12.4	8.43
	Richmond(RIC) - 1871	9.42	14.22	9.1	8.68	8.91	8.99	14.97	10.62
	Norfolk(ORF) - 1871	9.74	12.24	9.77	9.87	12.74	8.98	16.87	12.19
	Blacksburg(RNK) - 1952	8.78	8.69	6.54	11.88	7.45	11.91	13.53	8.78
	Roanoke(ROA) -1912	8.84	9.52	9.22	10.17	7.93	10.07	18.34	8.79
	Danville(DAN) -1945	8.31	10.3						9.85

Next Update Monday February 15th

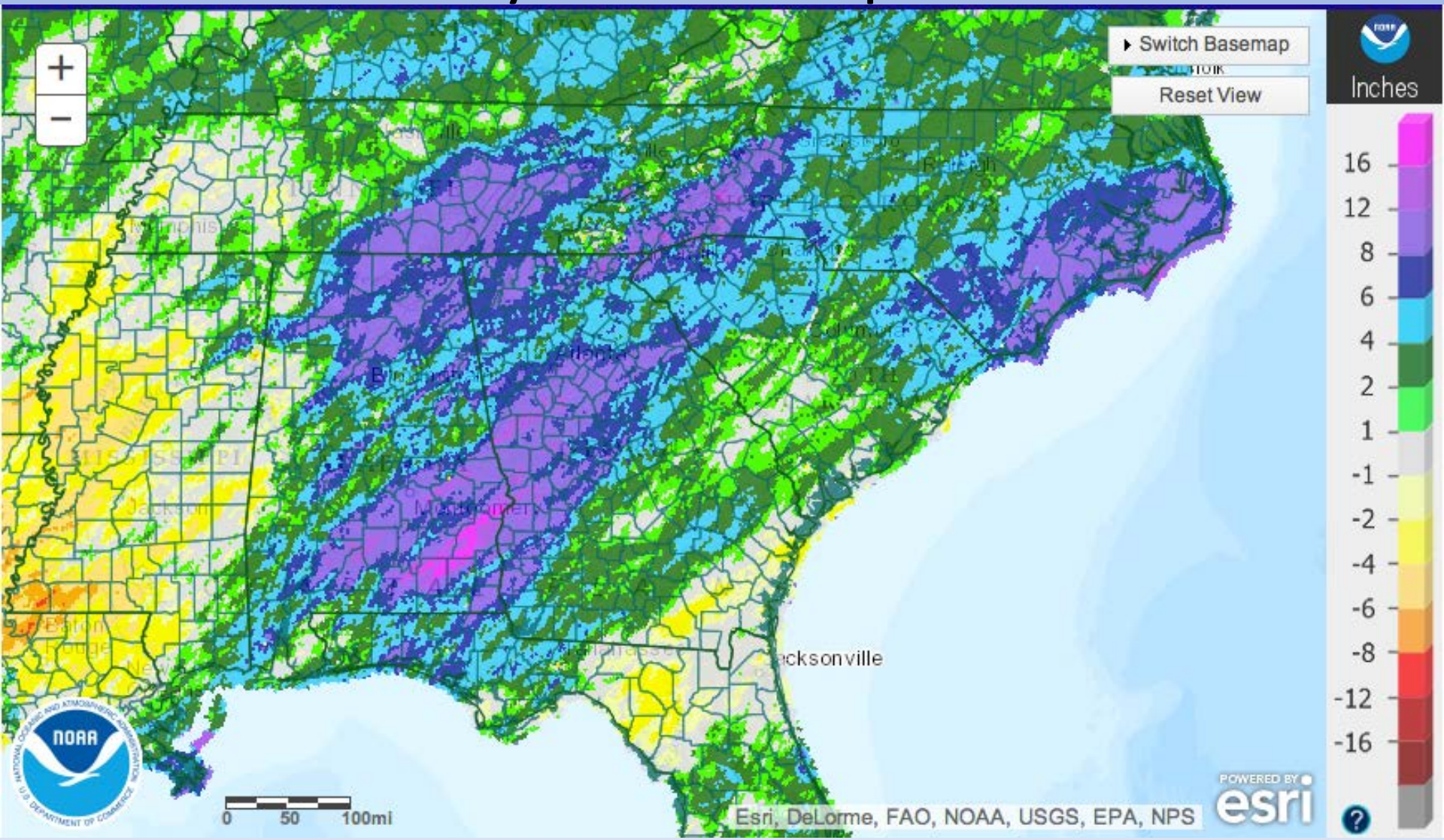
Apalachicola River at Blounstown



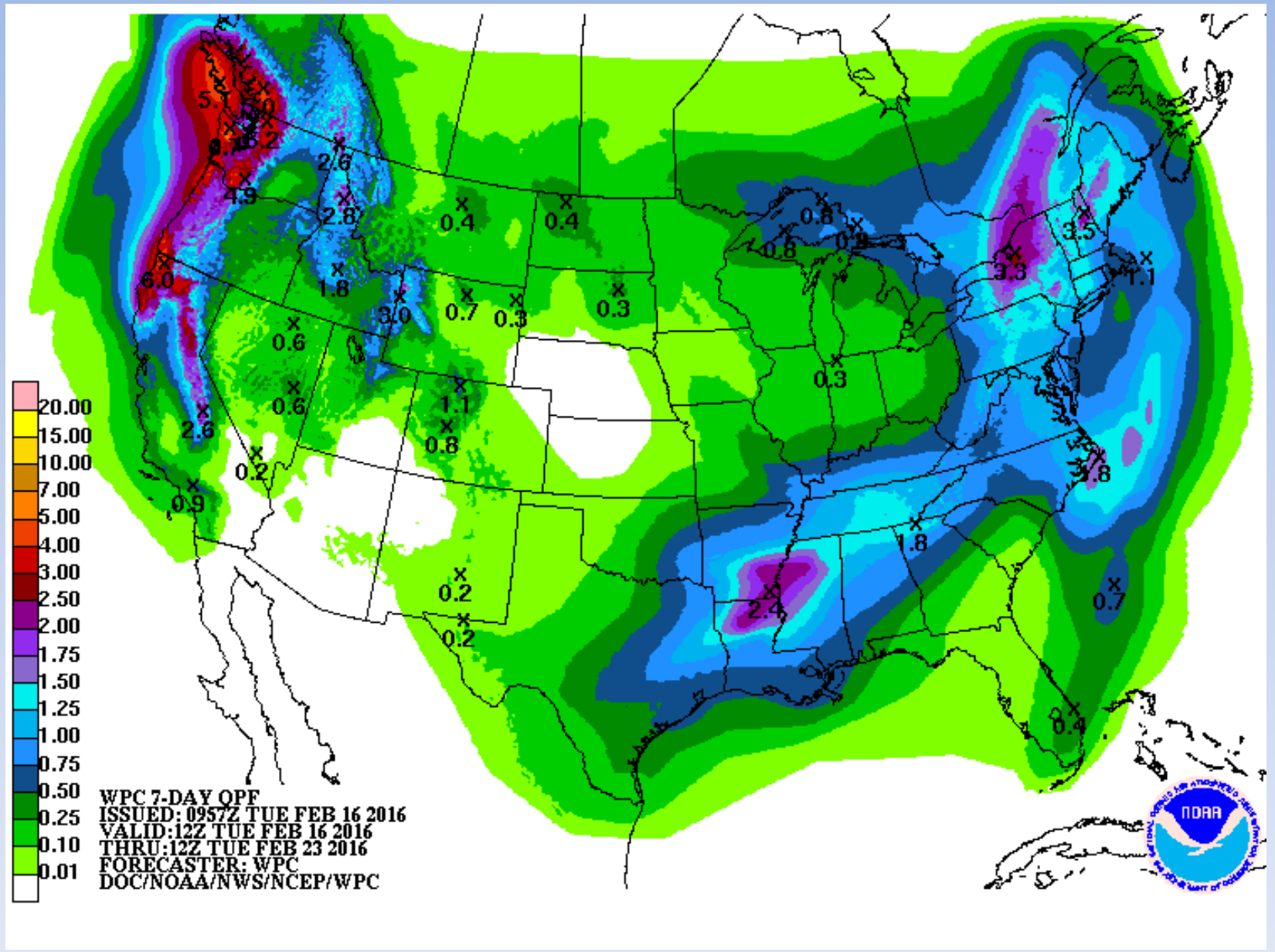
Rainfall – Last 7 Days



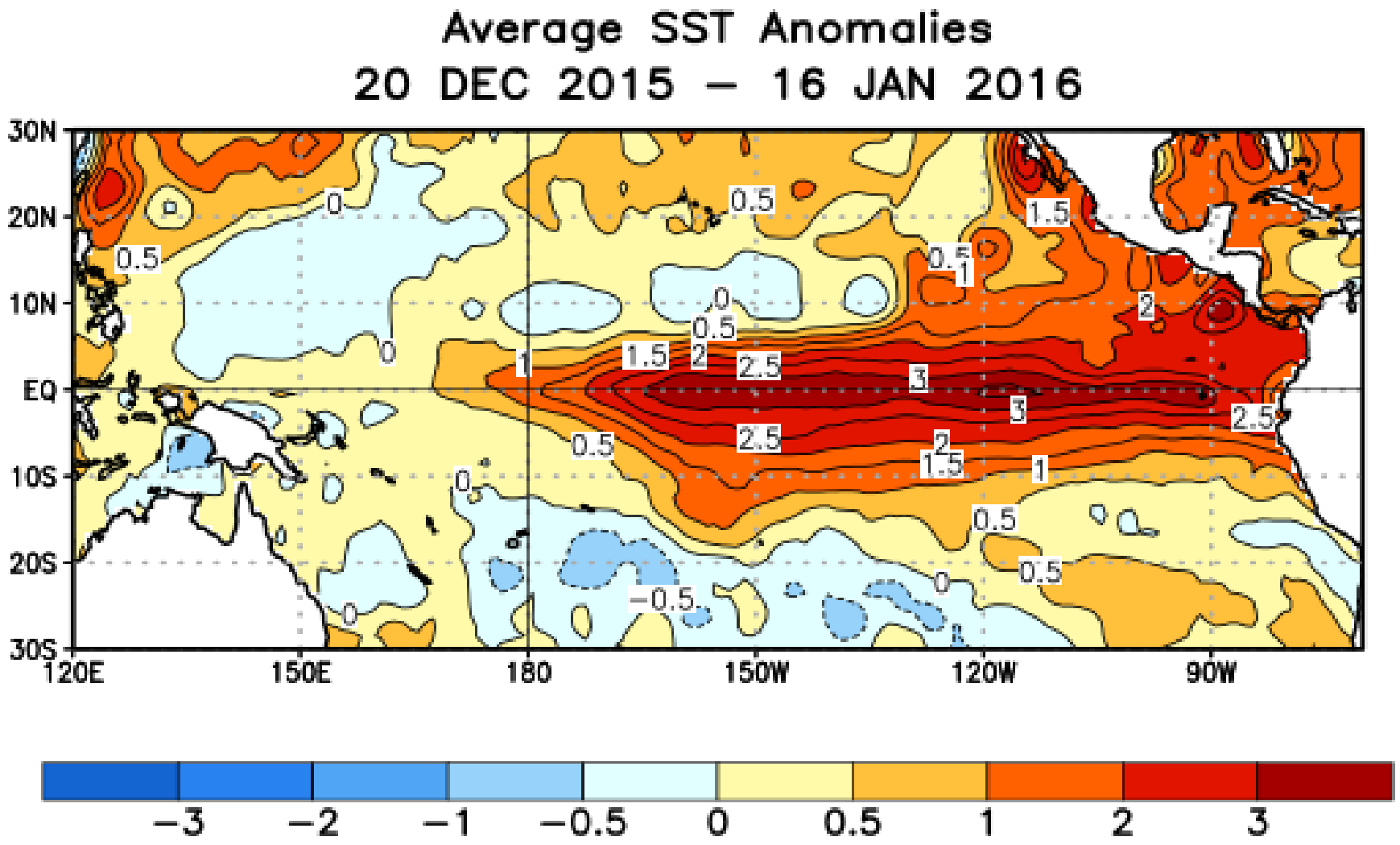
90-day Rainfall Departures



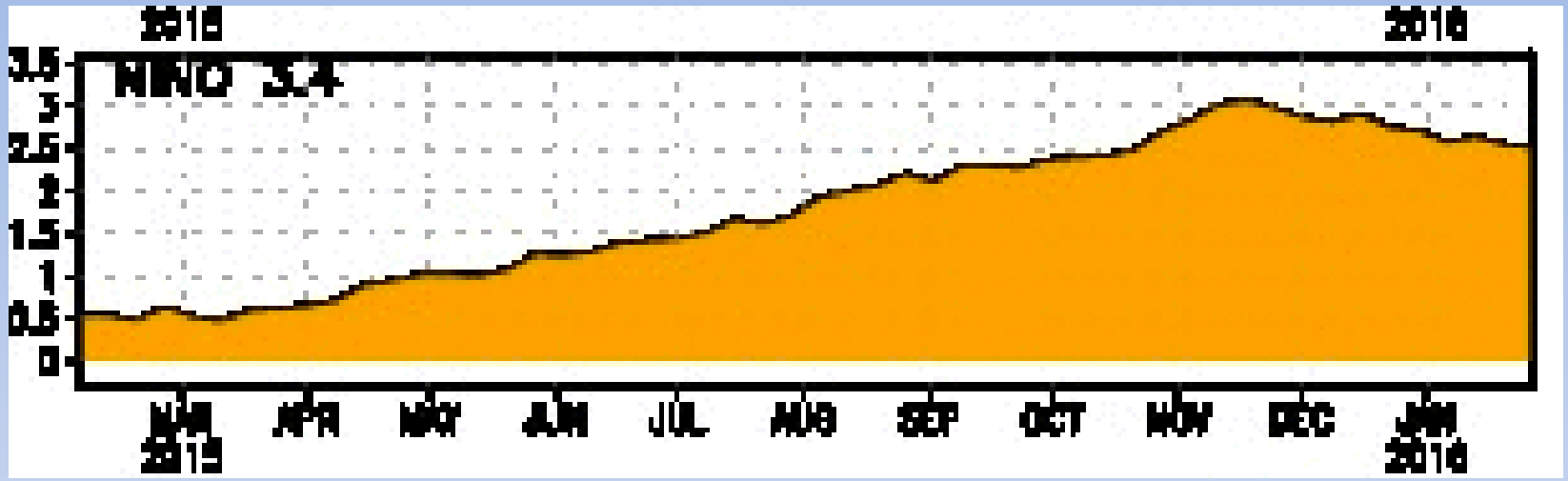
7-Day Precipitation Forecast



Current SST Anomalies



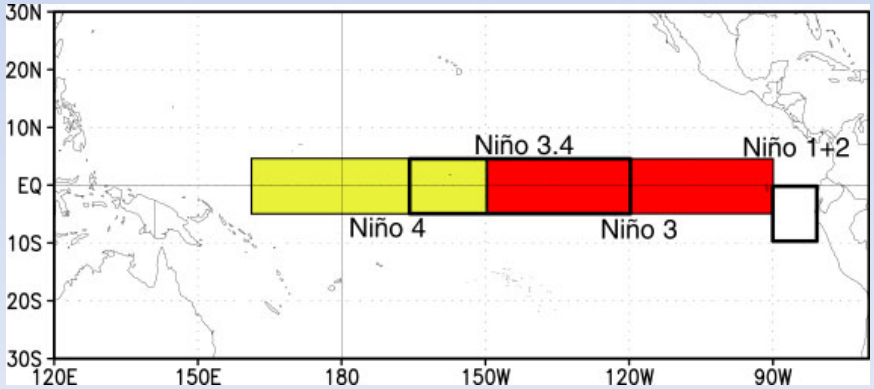
Nino 3.4 Index



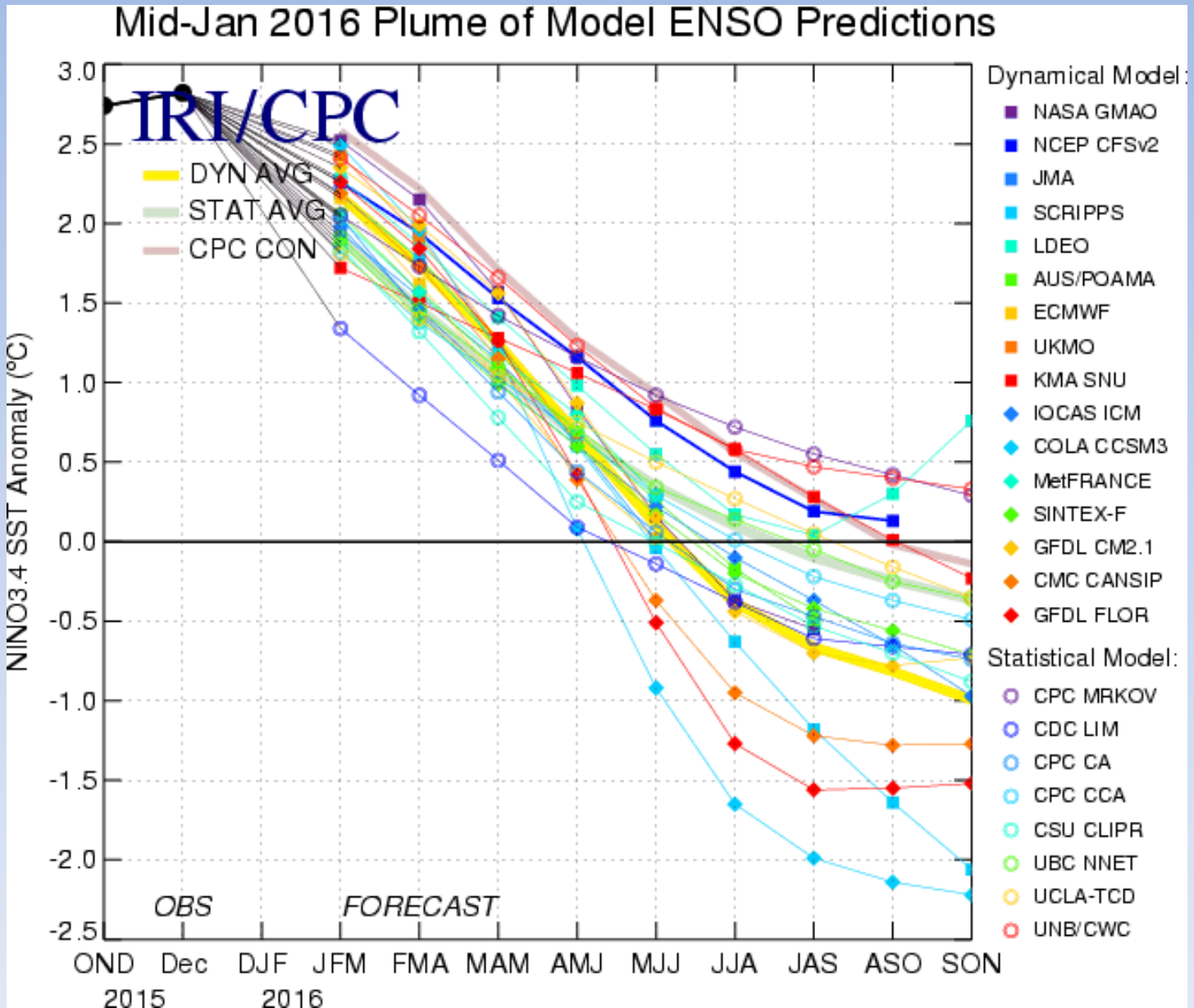
- Weekly value at +3.0, a new weekly record!

- Only one measure of El Nino's strength, will have to let the event play out.

- Same category as 82/82 and 97/98

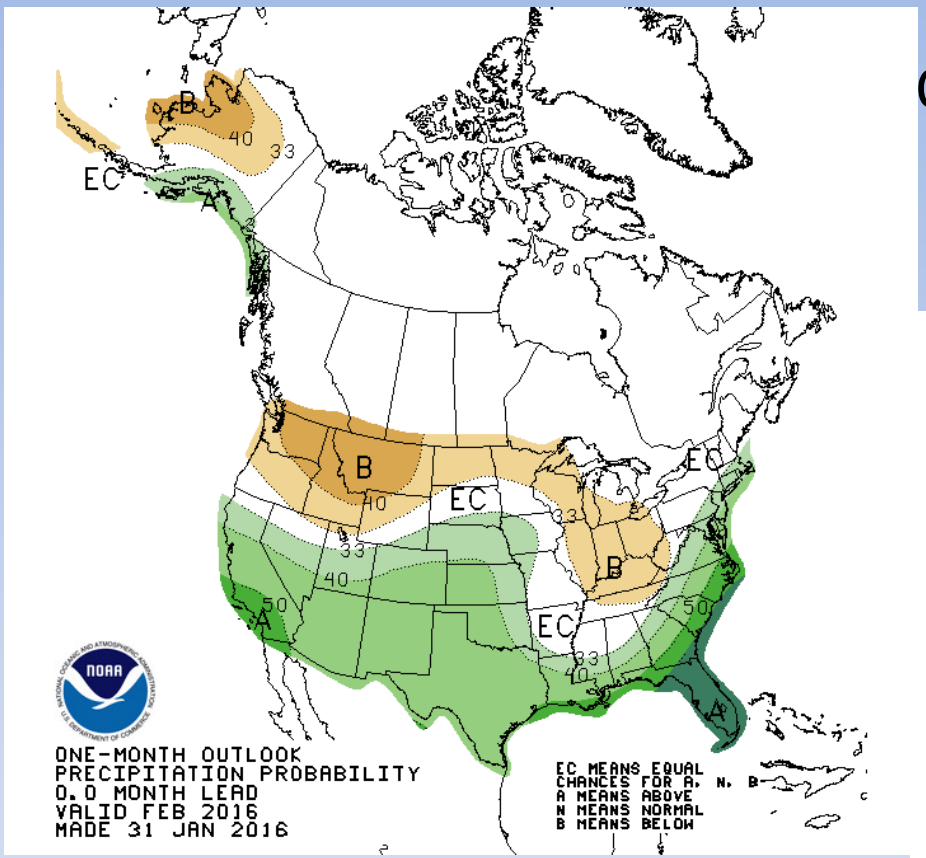


El Nino Forecast

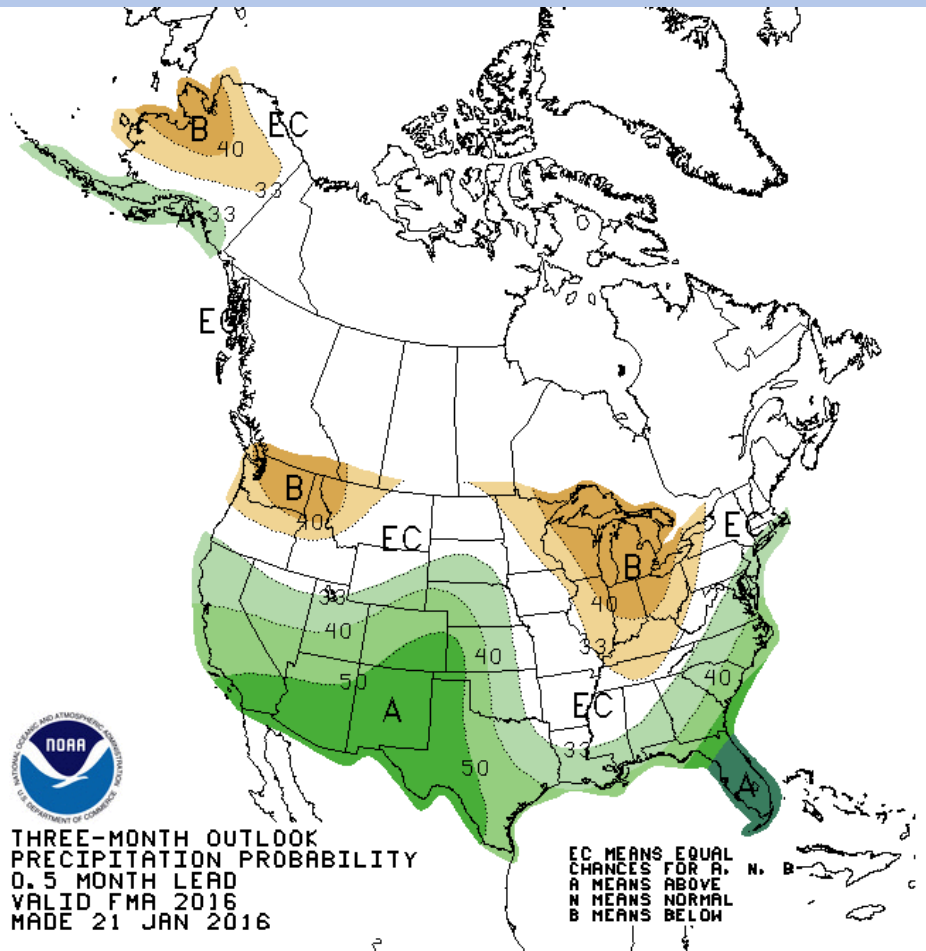


Official NOAA Outlook

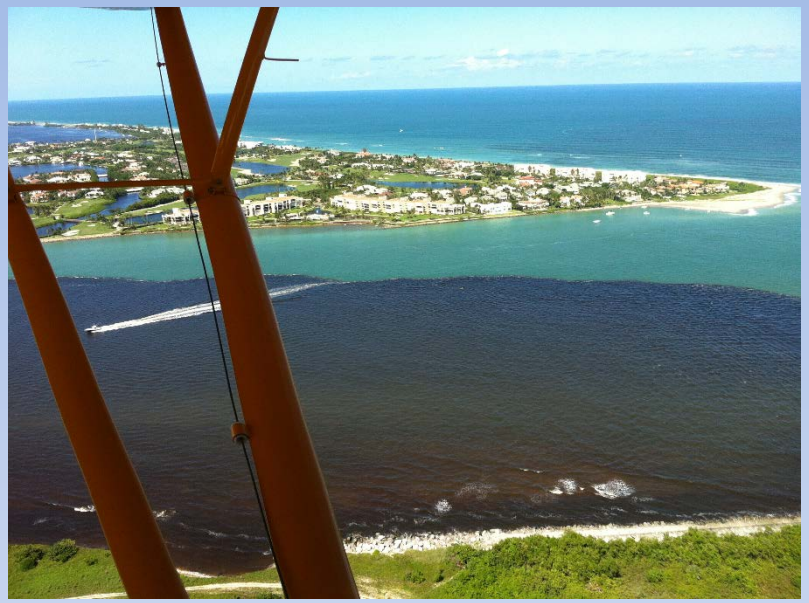
One Month



Winter (DJF)

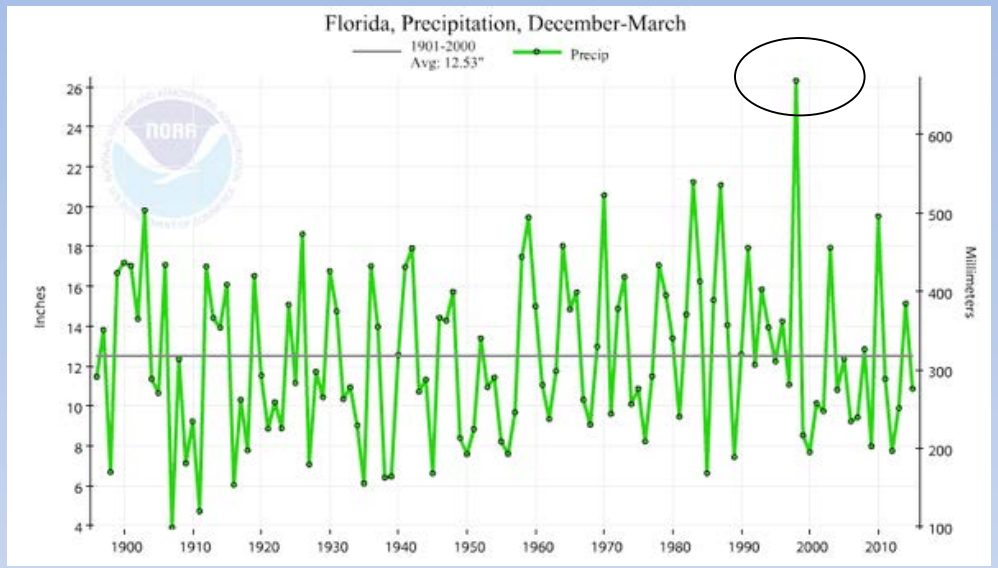


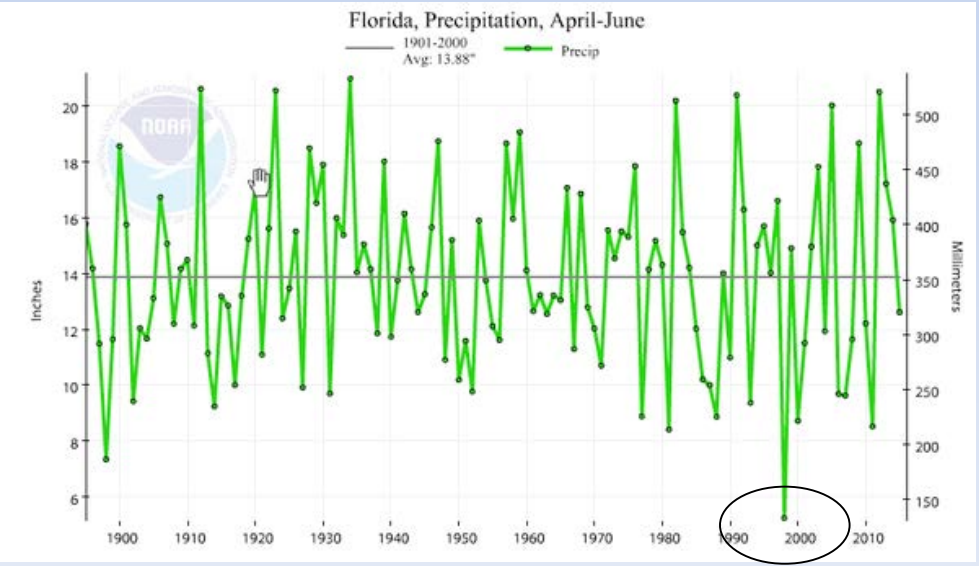
Remembering 1998

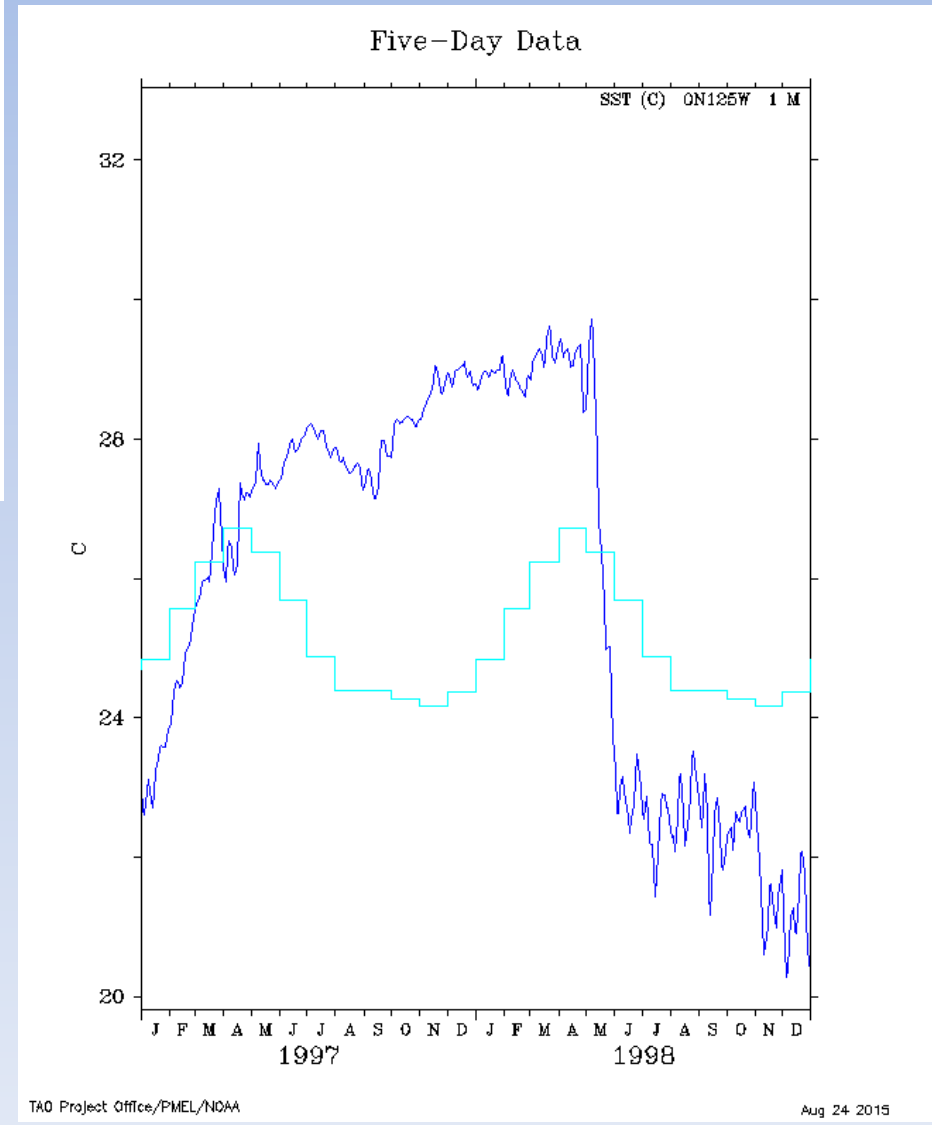


- State record winter (Nov. – Mar.) rainfall, 33 inches over south-central Florida
- Lake Okeechobee rises to 18.6’ (currently 16.55’ and rising).
- $100 million in crop damage from flooding, 75% loss of strawberry crop
- Deadliest tornado outbreak, killing 42 and injuring 350
- Tourism and occupancy rates dipped sharply
- Worst wildfire season on record, half-million acres burned, $620 million in losses

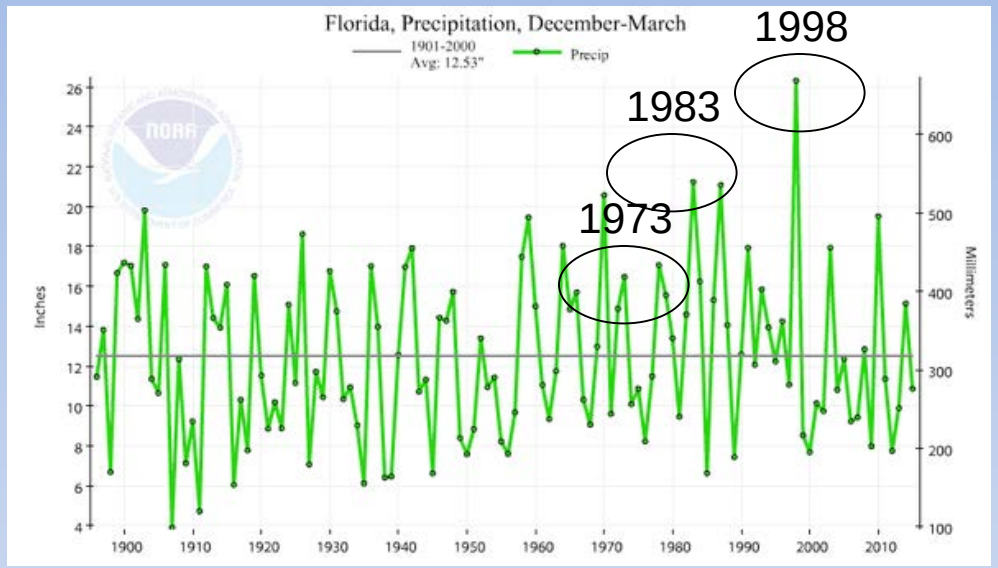
Will 2016 in Florida Repeat 1998?

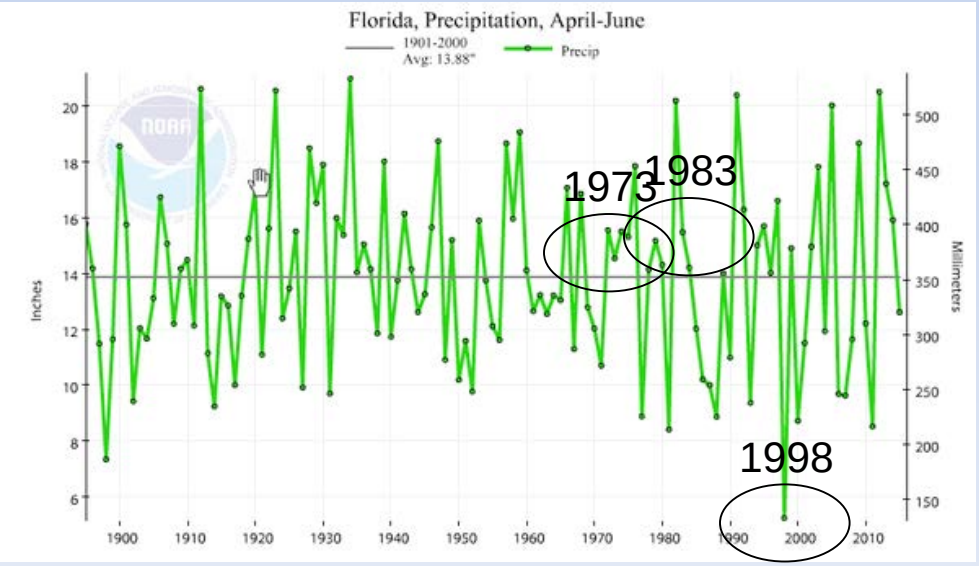






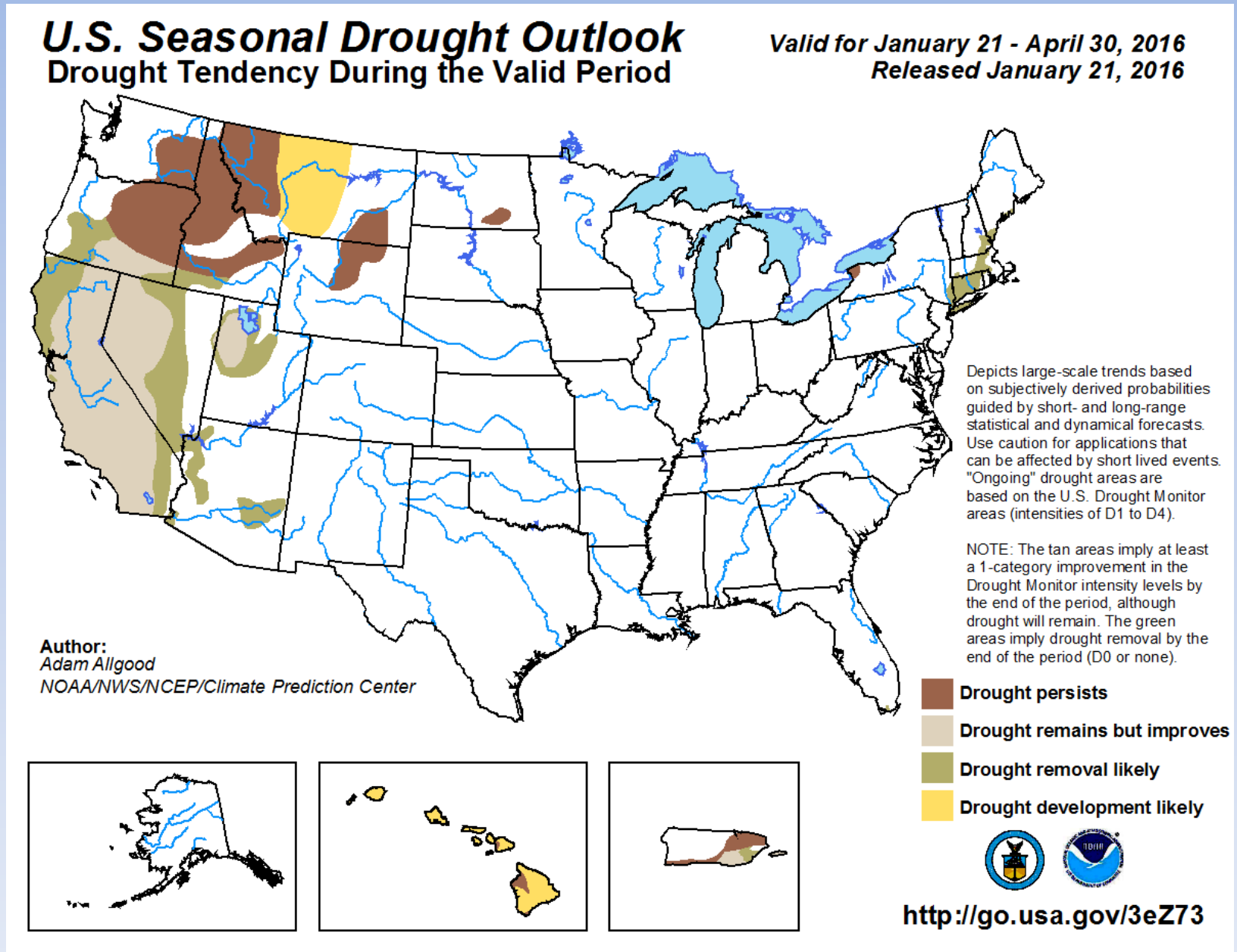
Similar El Nino's to 1998?





- 1983 was El Nino of similar strength
- 1973 was strong El Nino with rapid spring transition to La Nina.
- 1998 brought record winter rainfall, 1983 set previous record, 1973 above normal.
- 1998 brought record spring dryness.
- 1983 and 1973 brought above normal spring rainfall.
- No precedent for the record spring drought in Florida in 1998.

U.S. Drought Outlook

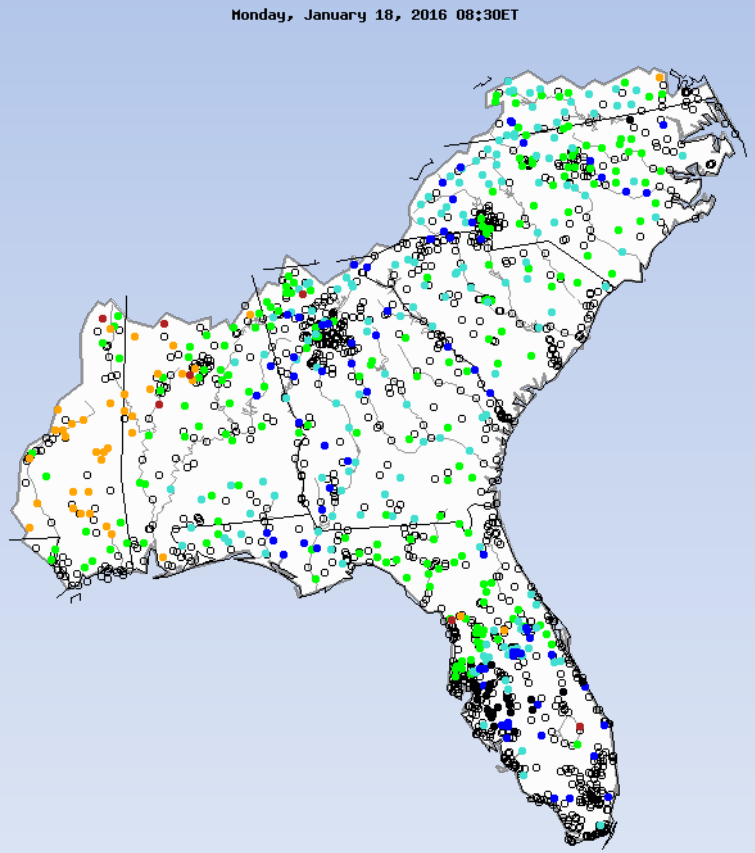


Streamflows and Groundwater

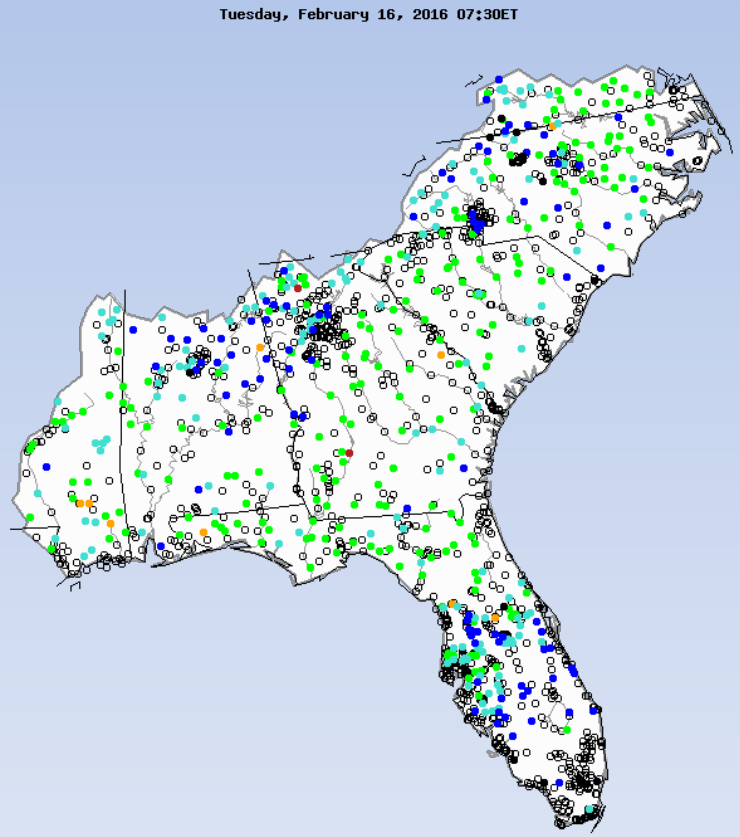
Paul Ankcorn

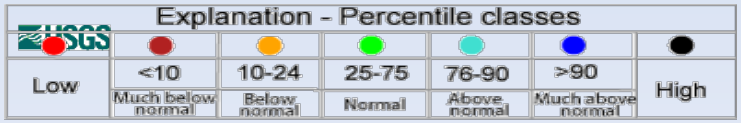
Realtime stream flow compared with historical monthly averages

Previous Brief:



Current:

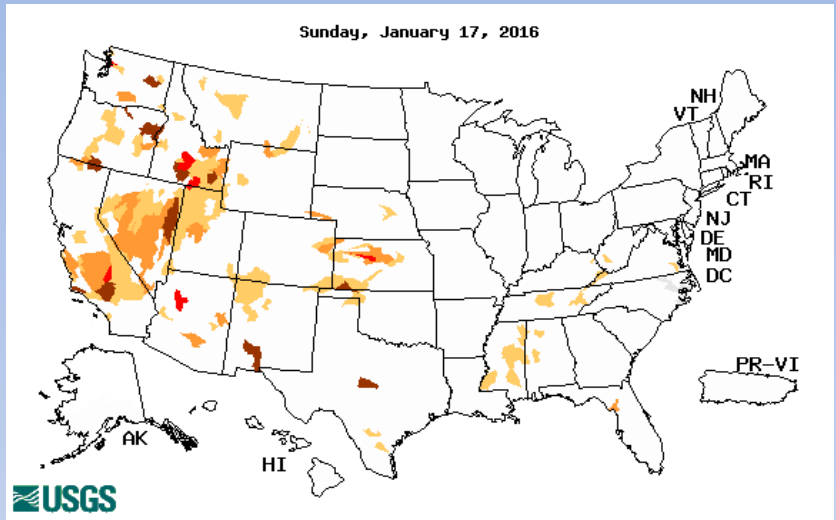




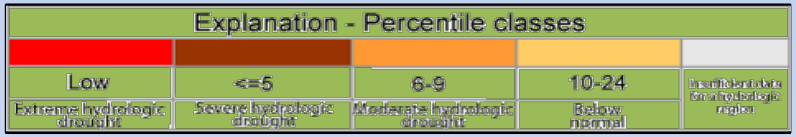
USGS http://waterwatch.usgs.gov

Below Normal 7-day Average Streamflows

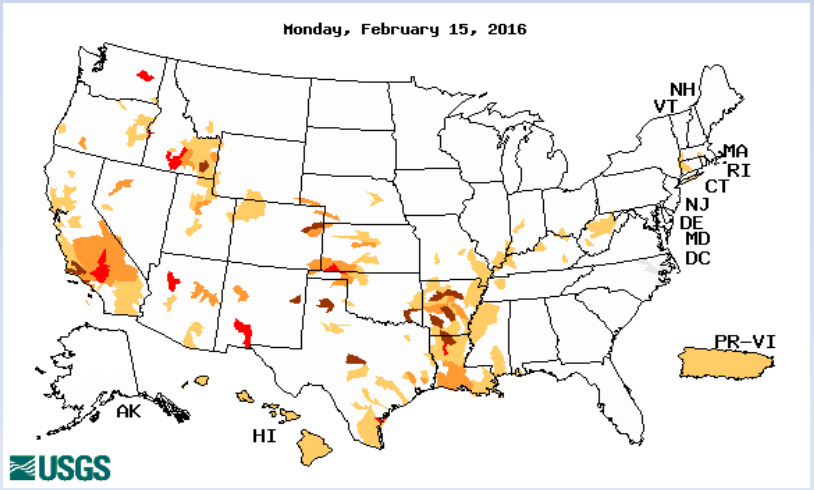
Previous brief:



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



Current:



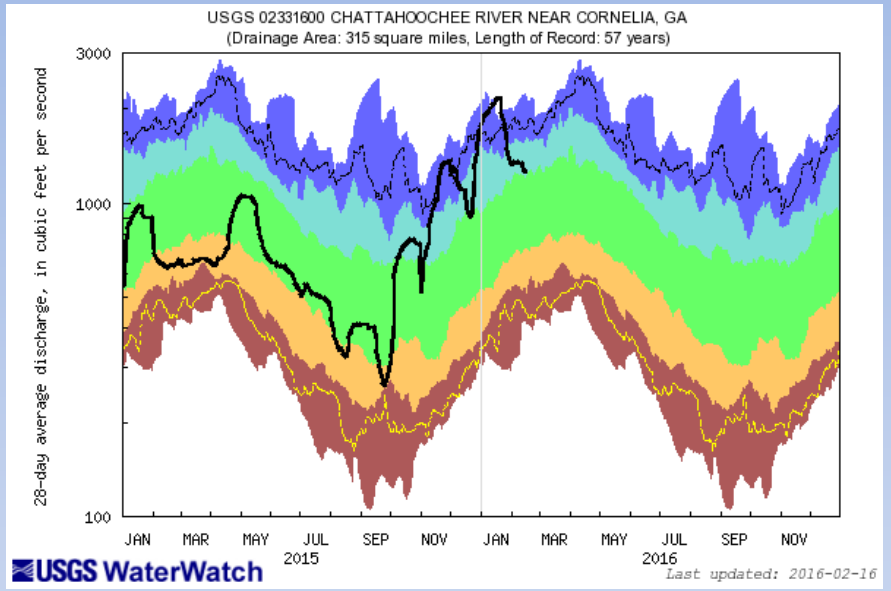
http://waterwatch.usgs.gov

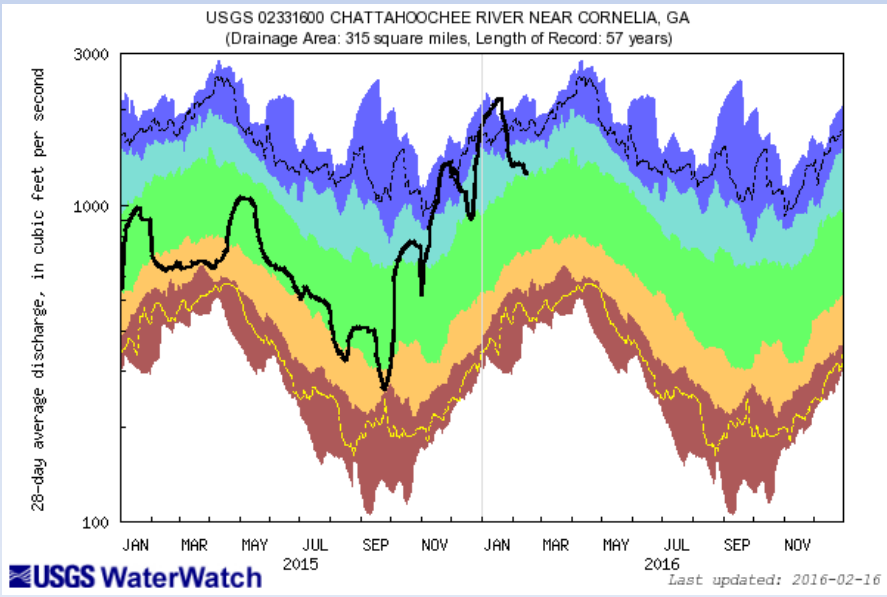
Lake Lanier Inflows

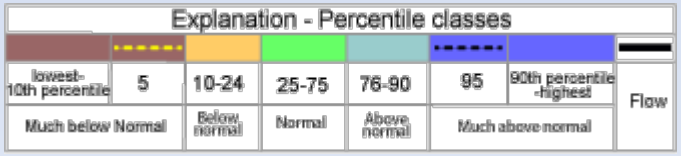
Chattahoochee near Cornelia (02331600)

http://waterwatch.usgs.gov

Chestatee near Dahlonega (02333500)





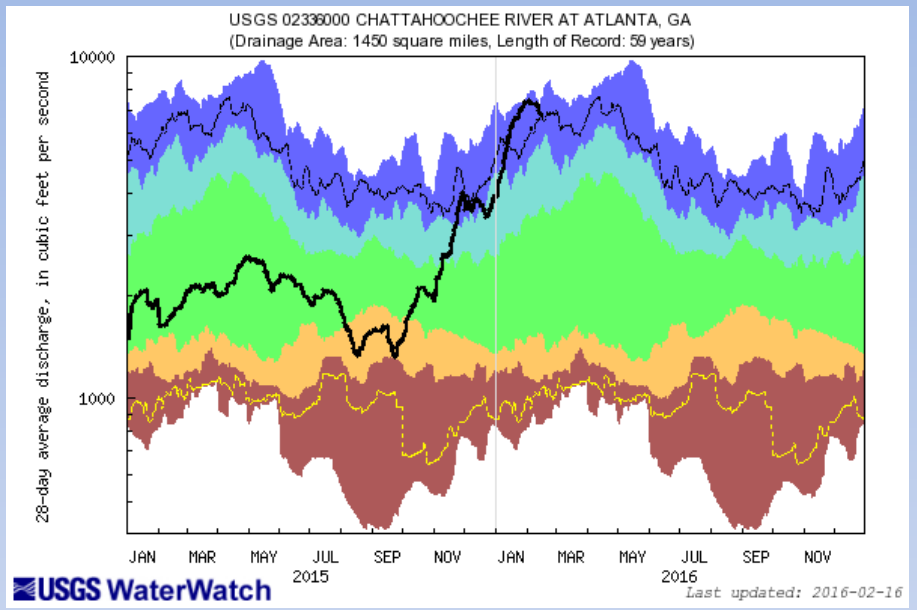


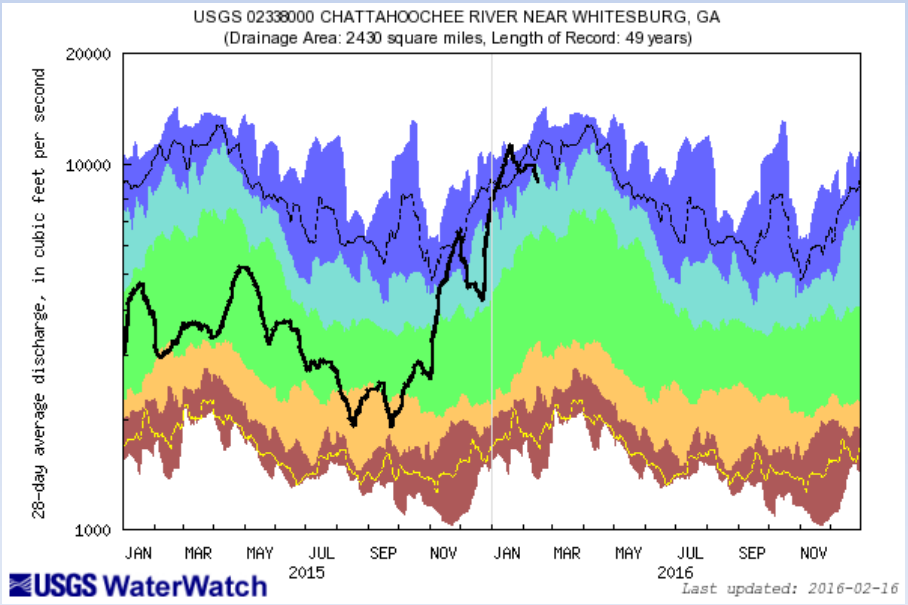
Current Streamflows

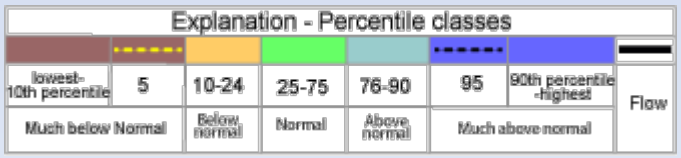
Chattahoochee at Atlanta (02336000)

http://waterwatch.usgs.gov

Chattahoochee near Whitesburg (02338000)





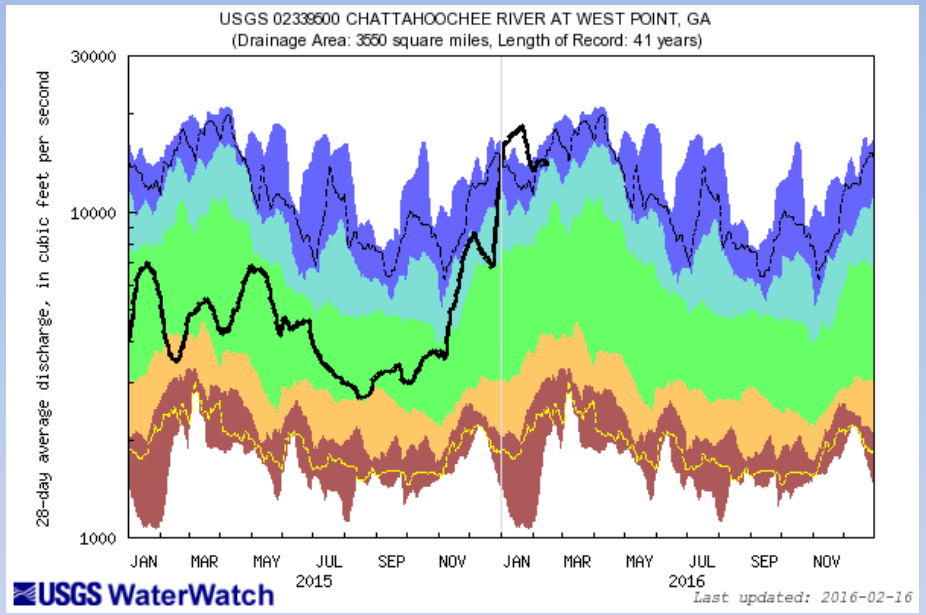


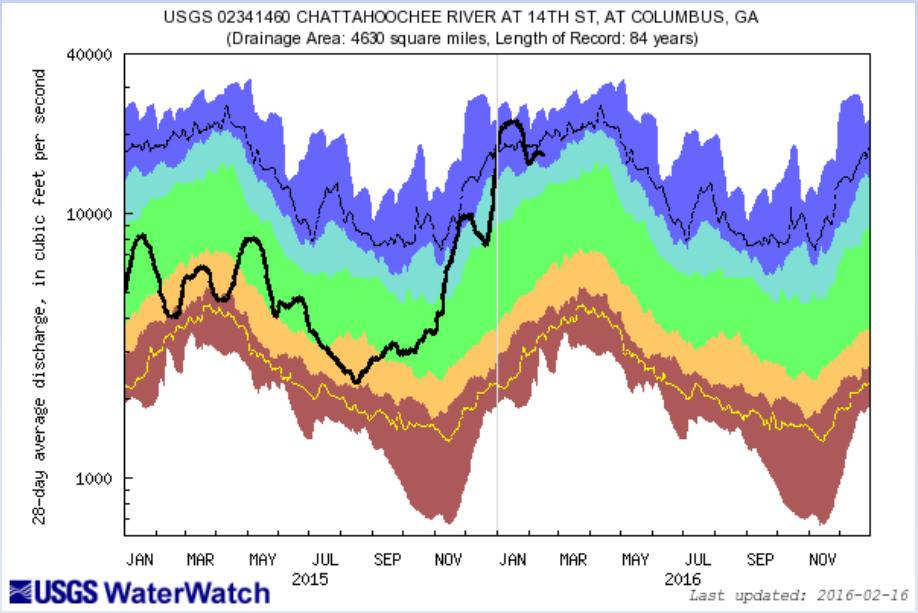
Current Streamflows

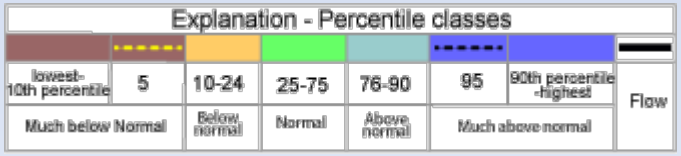
Chattahoochee at West Point (02339500)

http://waterwatch.usgs.gov

Chattahoochee at Columbus(02341460)





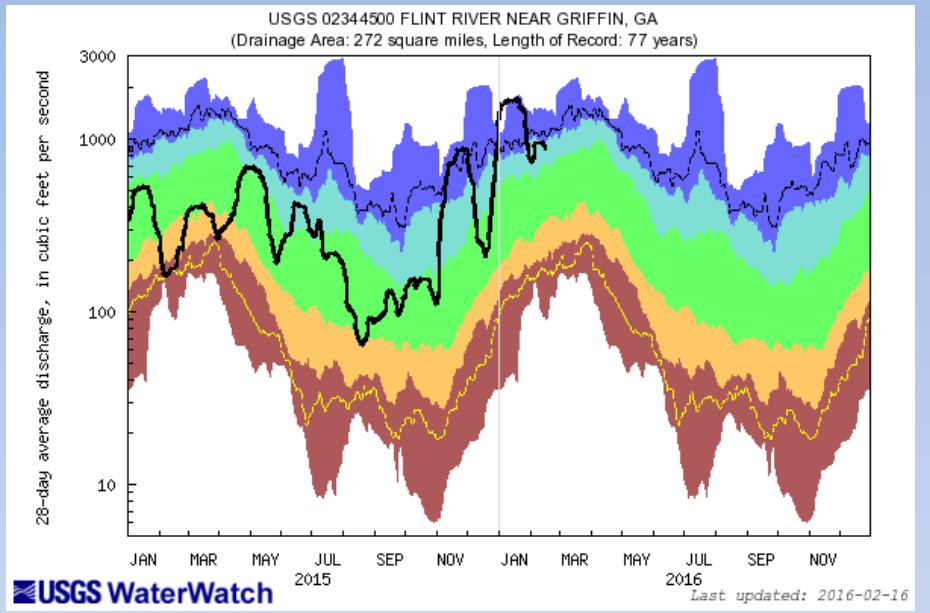


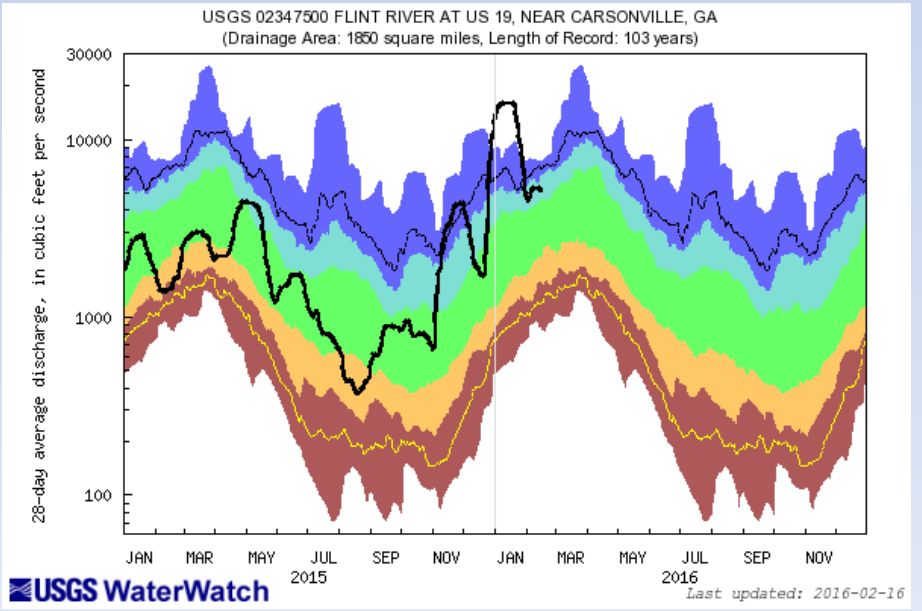
Current Streamflows

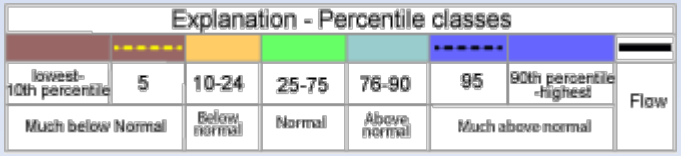
Flint River near Griffin (02344500)

http://waterwatch.usgs.gov

Flint River near Carsonville (02347500)





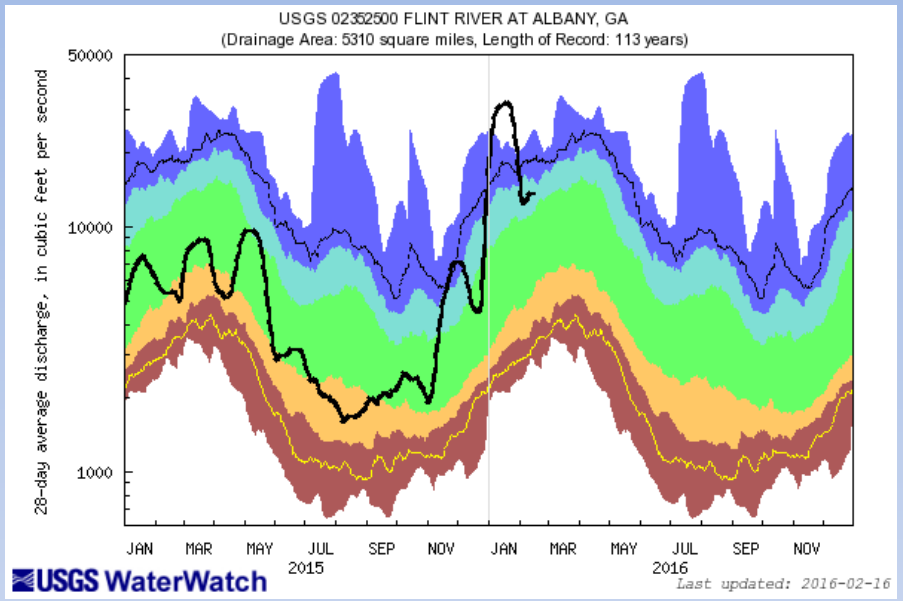


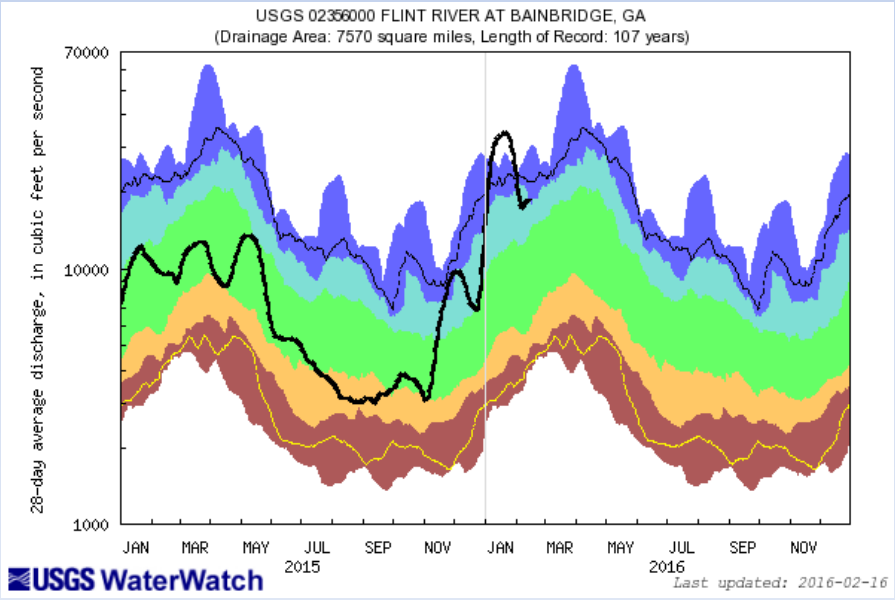
Current Streamflows

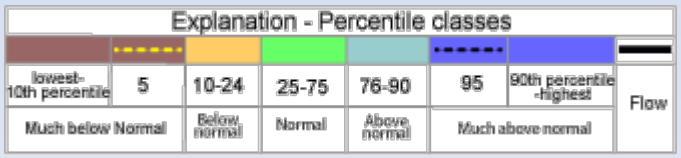
Flint River at Albany (02352500)

http://waterwatch.usgs.gov

Flint at Bainbridge (02356000)

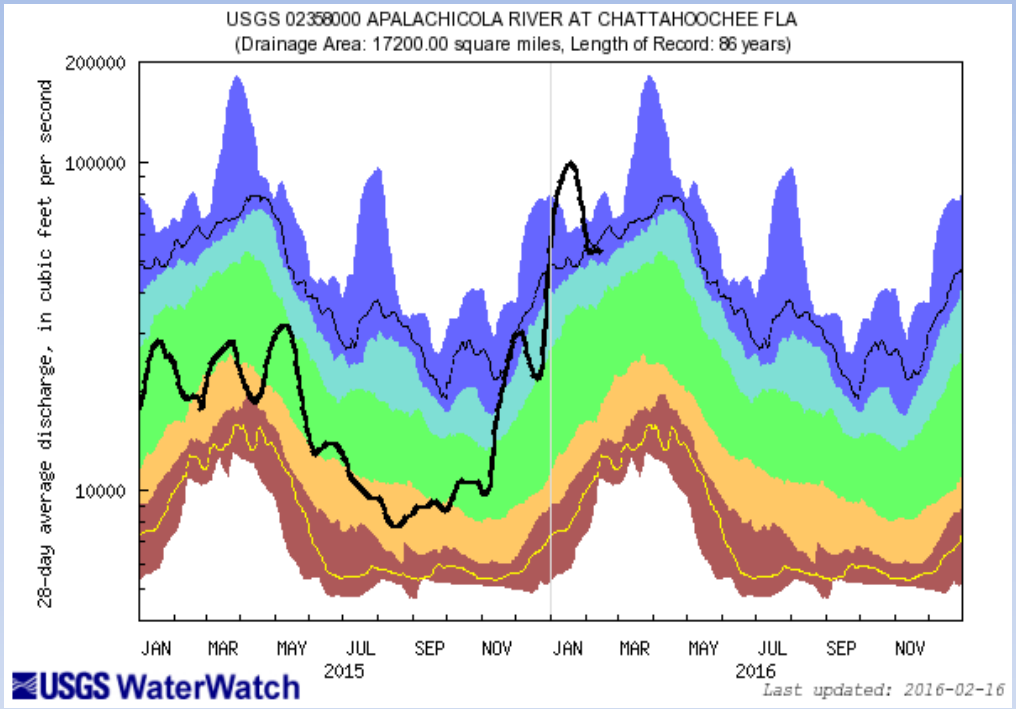


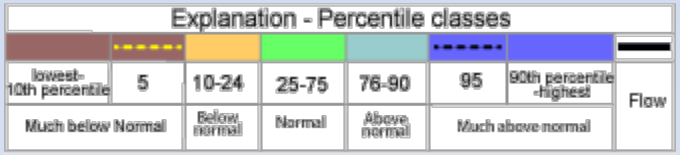




Streamflows

Apalachicola at Chattahoochee (02358000)

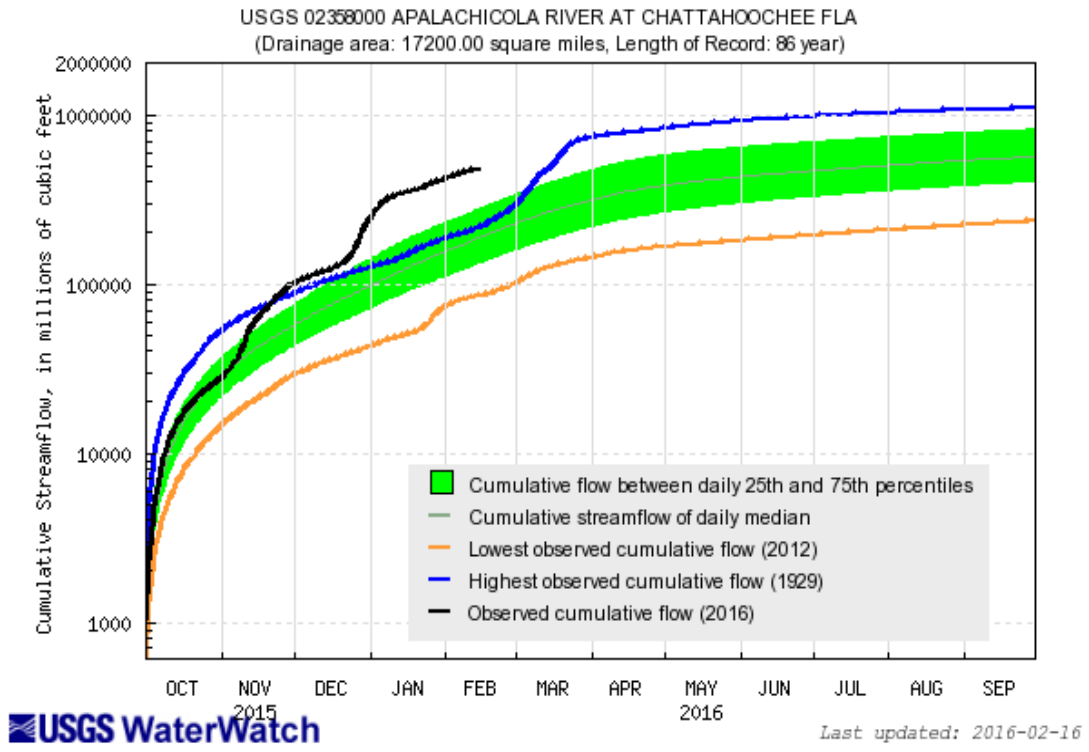




http://waterwatch.usgs.gov

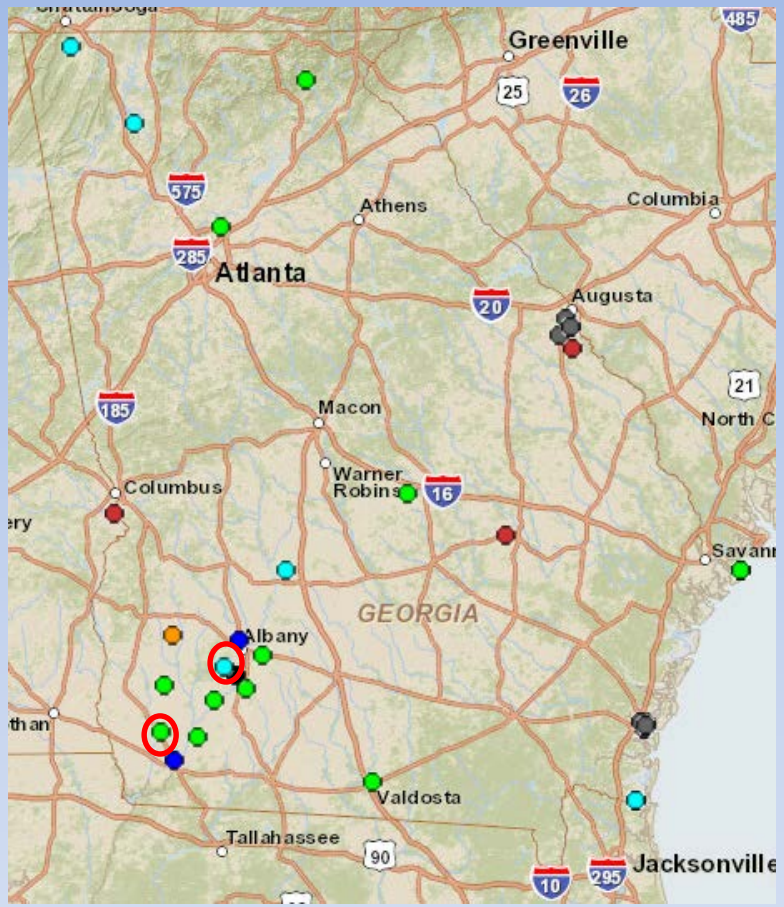
Streamflows

Apalachicola at Chattahoochee (02358000)

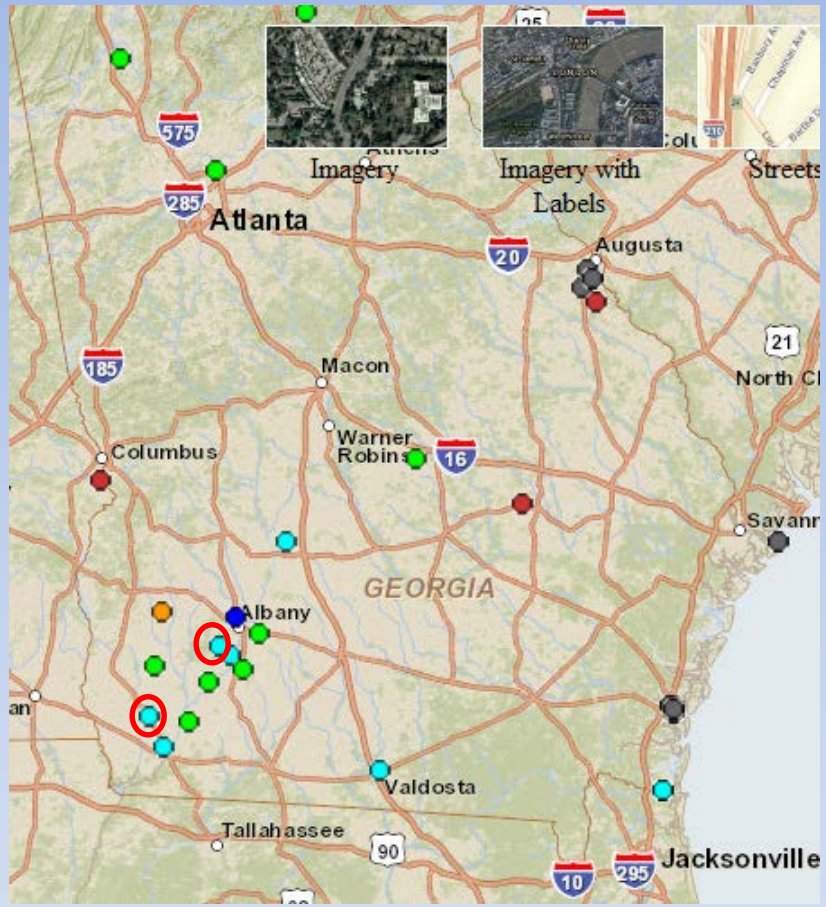


http://waterwatch.usgs.gov

Groundwater Conditions



Previous brief



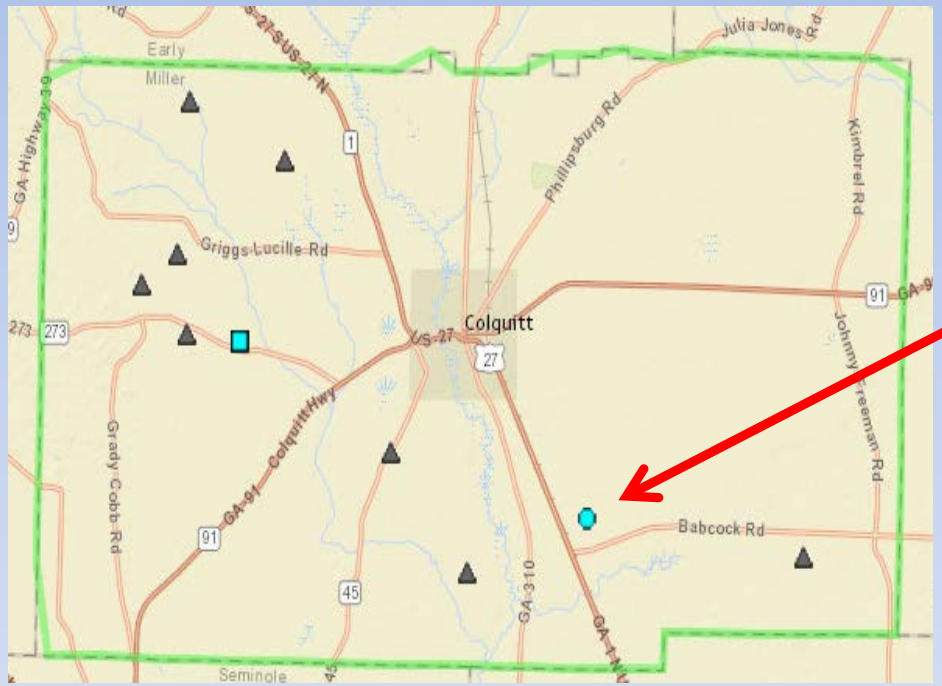
Current brief

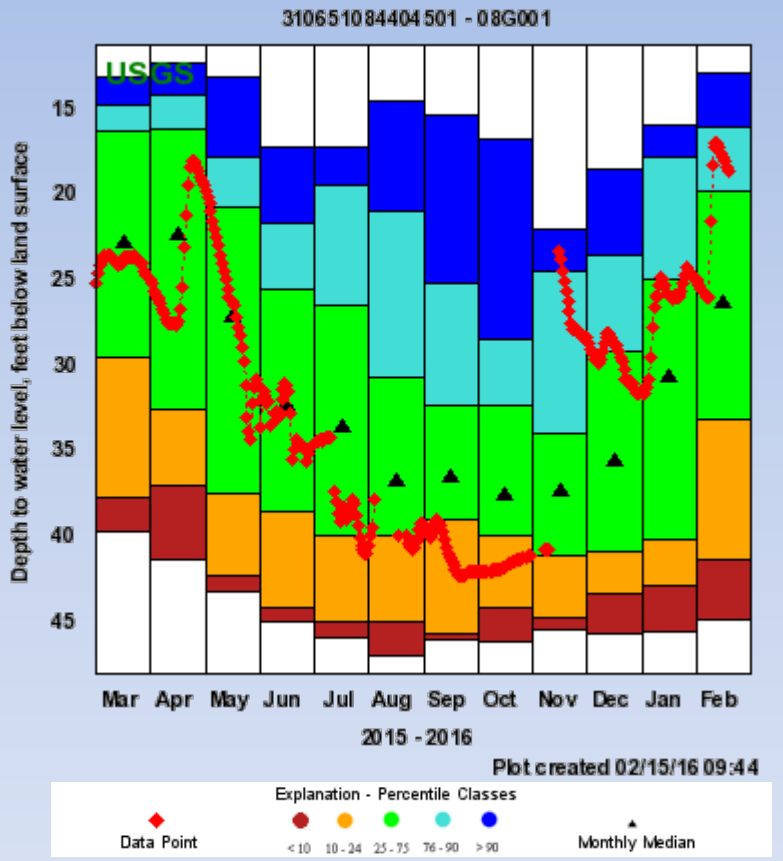
Explanation - Percentile classes (symbol color based on most recent measurement)							
Low	<10	10-24	25-75	76-90	>90	High	Not Ranked
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal		

Wells	Springs
Real-Time	
Continuous	
Periodic Measurements	

http://groundwaterwatch.usgs.gov

Groundwater Status – Miller County 08G001



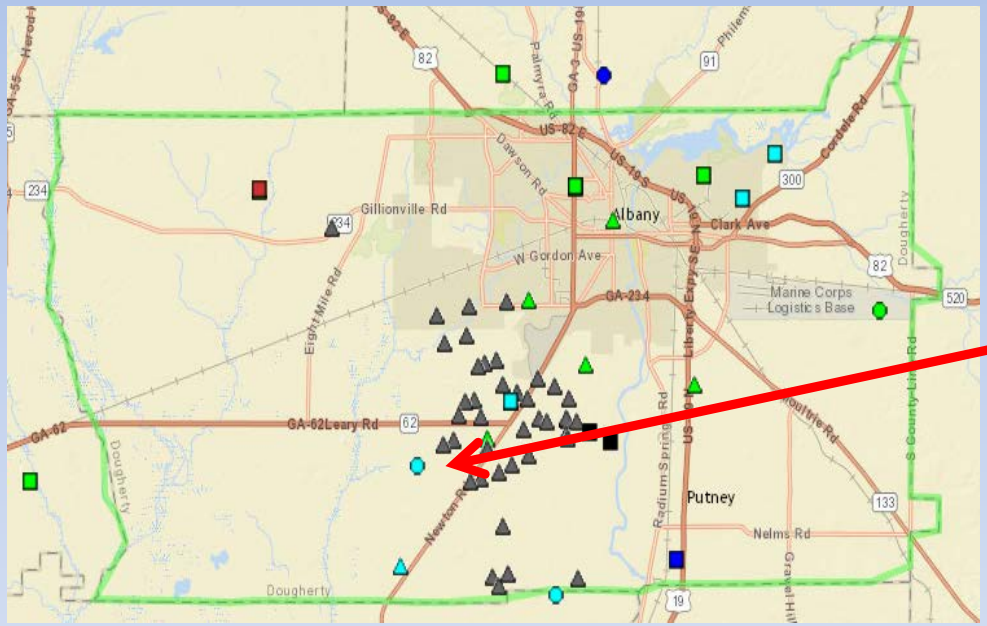


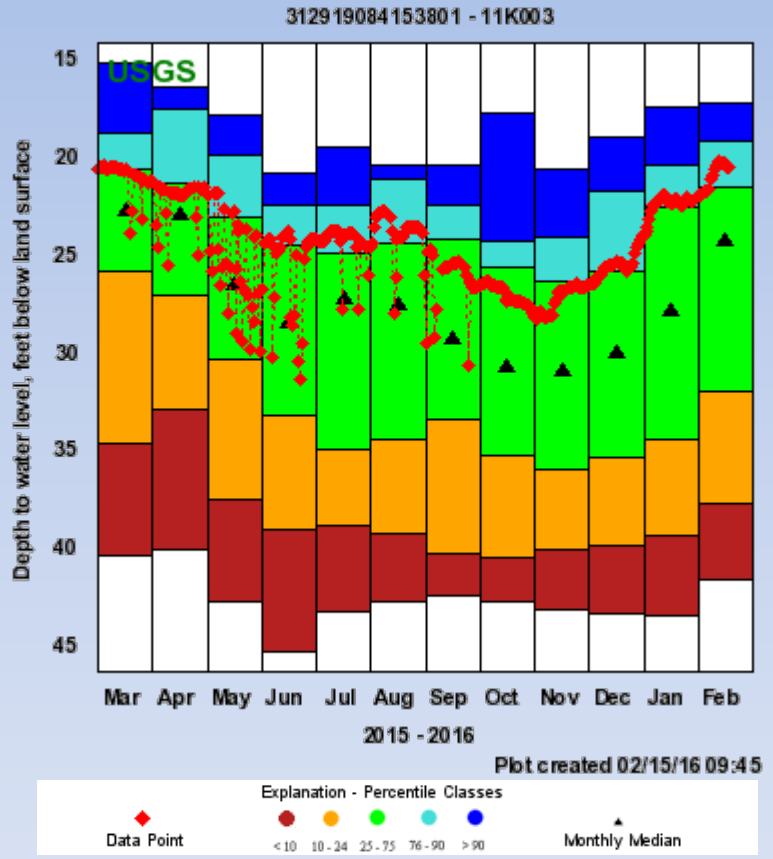
Explanation - Percentile classes (symbol color based on most recent measurement)							
Low	<10 Much Below Normal	10-24 Below Normal	25-75 Normal	76-90 Above Normal	>90 Much Above Normal	High	Not Ranked

Wells / Springs
- Real-Time
- Continuous
- Periodic Measurements

(Upper Floridan Aquifer)

Groundwater Status – Dougherty County 11K003





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

Wells / Springs
- Real-Time
- Continuous
- Periodic Measurements

(Upper Floridan Aquifer)

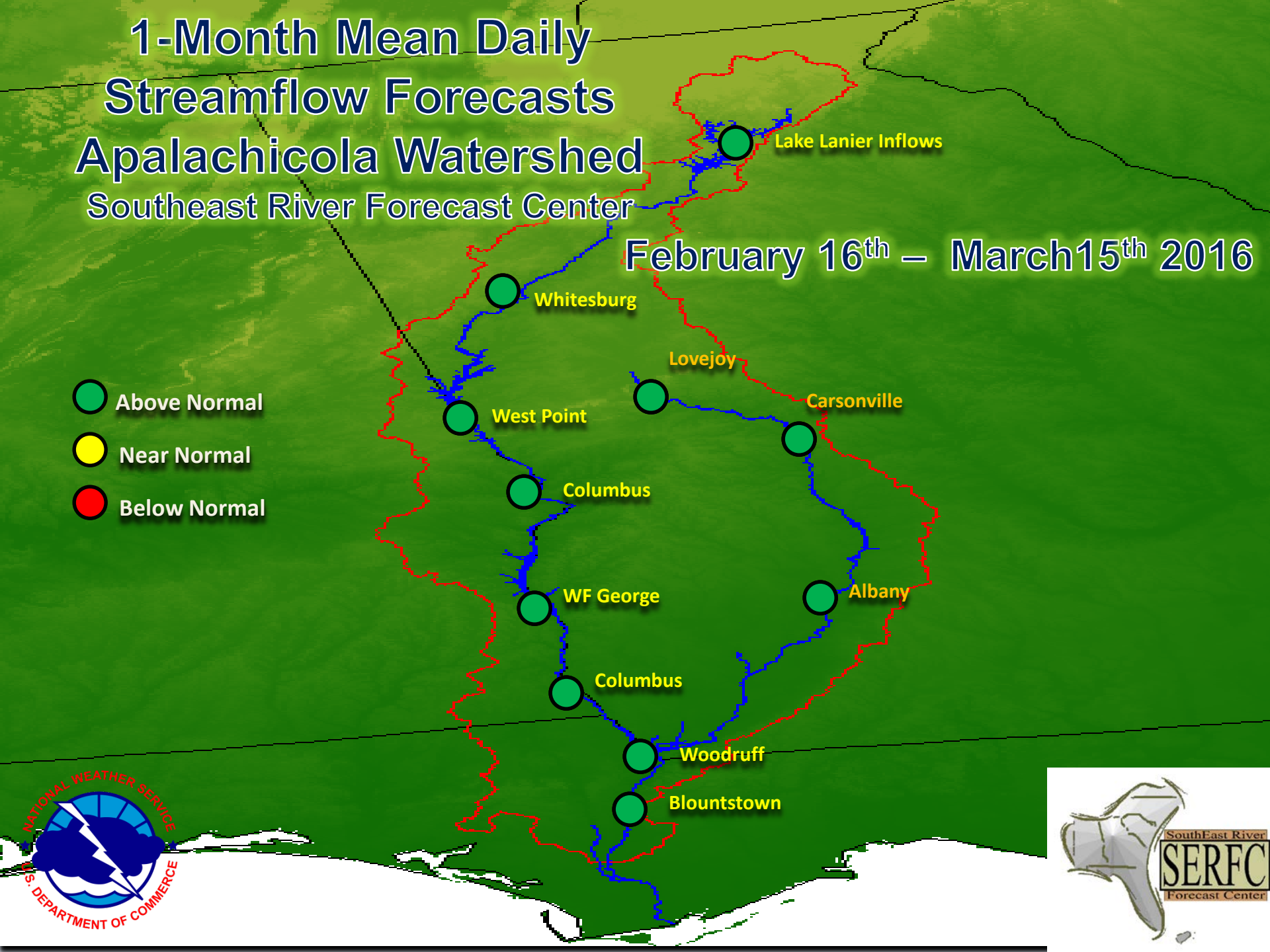
Streamflow Forecasts

Jeff Dobur

1-Month Mean Daily Streamflow Forecasts Apalachicola Watershed

Southeast River Forecast Center

February 16th – March15th 2016

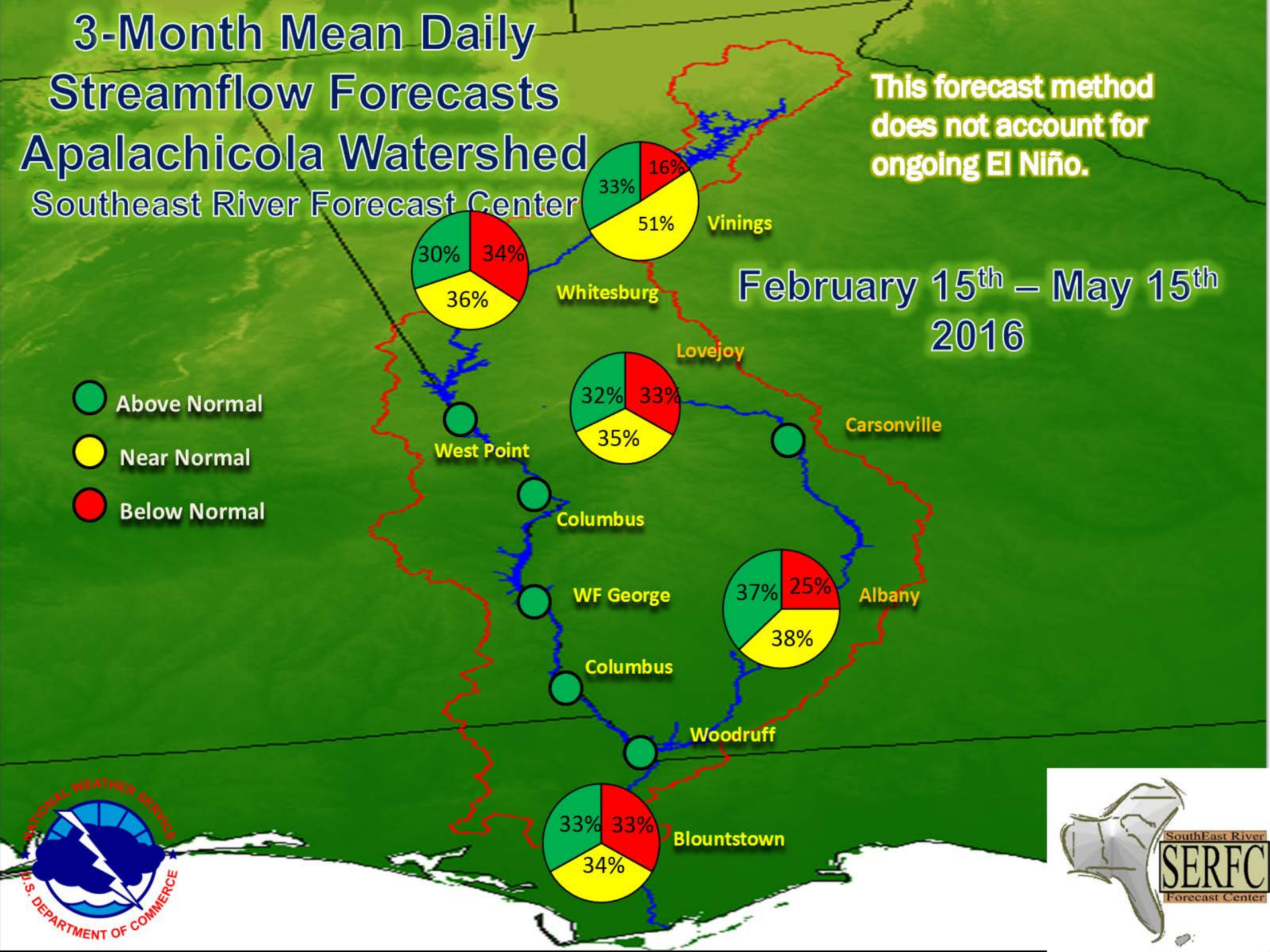


3-Month Mean Daily Streamflow Forecasts Apalachicola Watershed

Southeast River Forecast Center

This forecast method does not account for ongoing El Niño.

February 15th – May 15th 2016

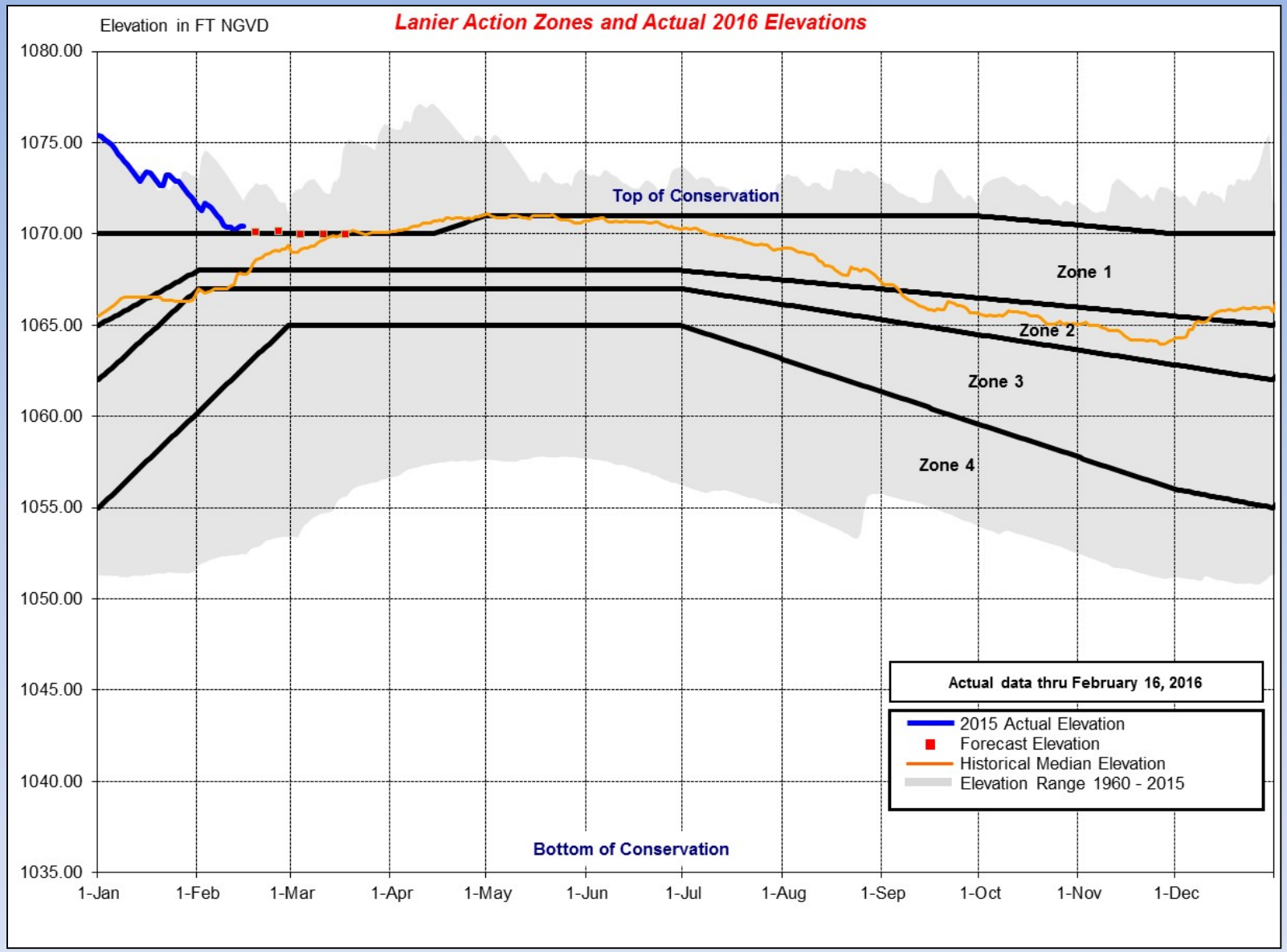


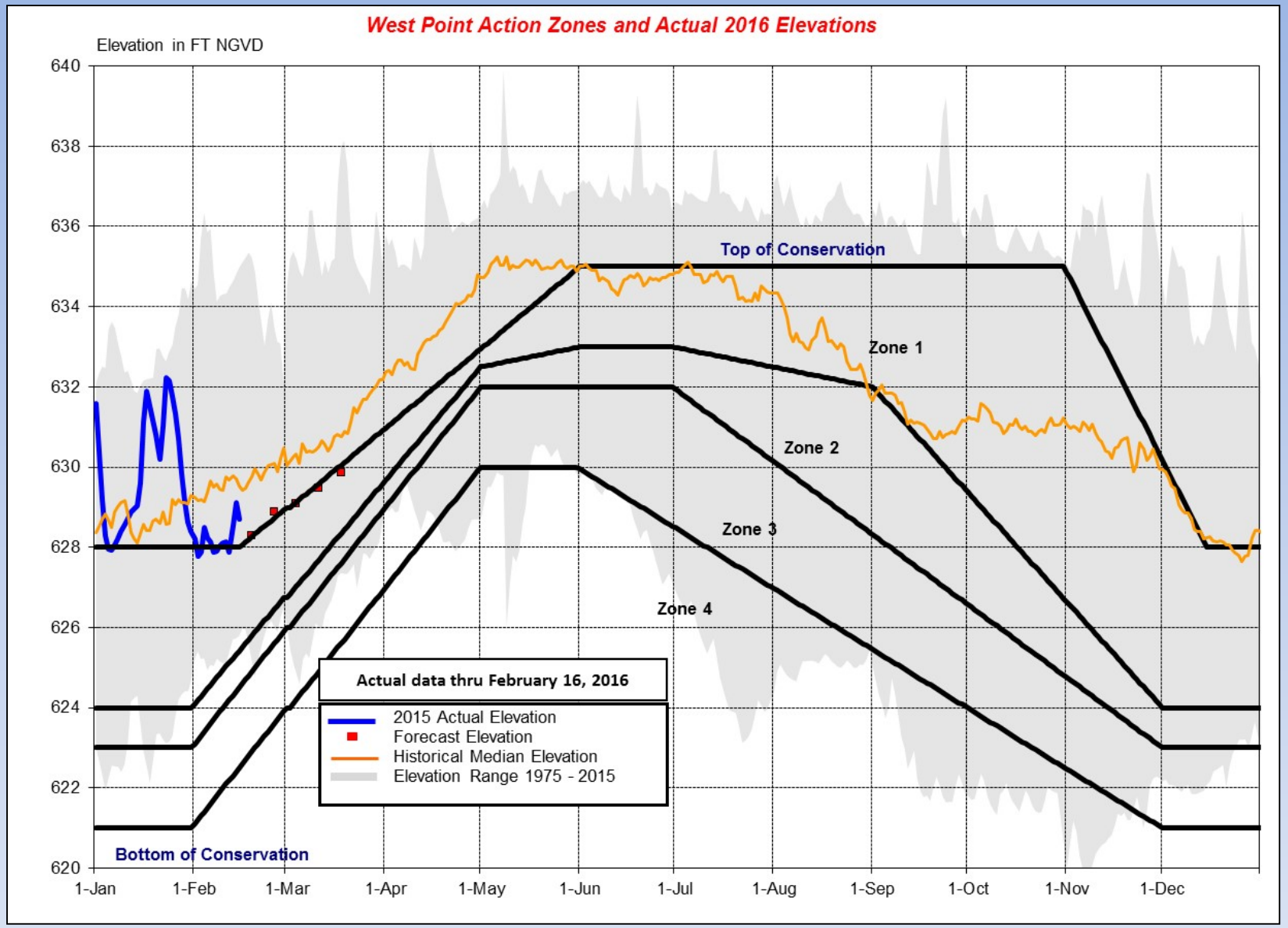
NATIONAL WEATHER SERVICE
U.S. DEPARTMENT OF COMMERCE

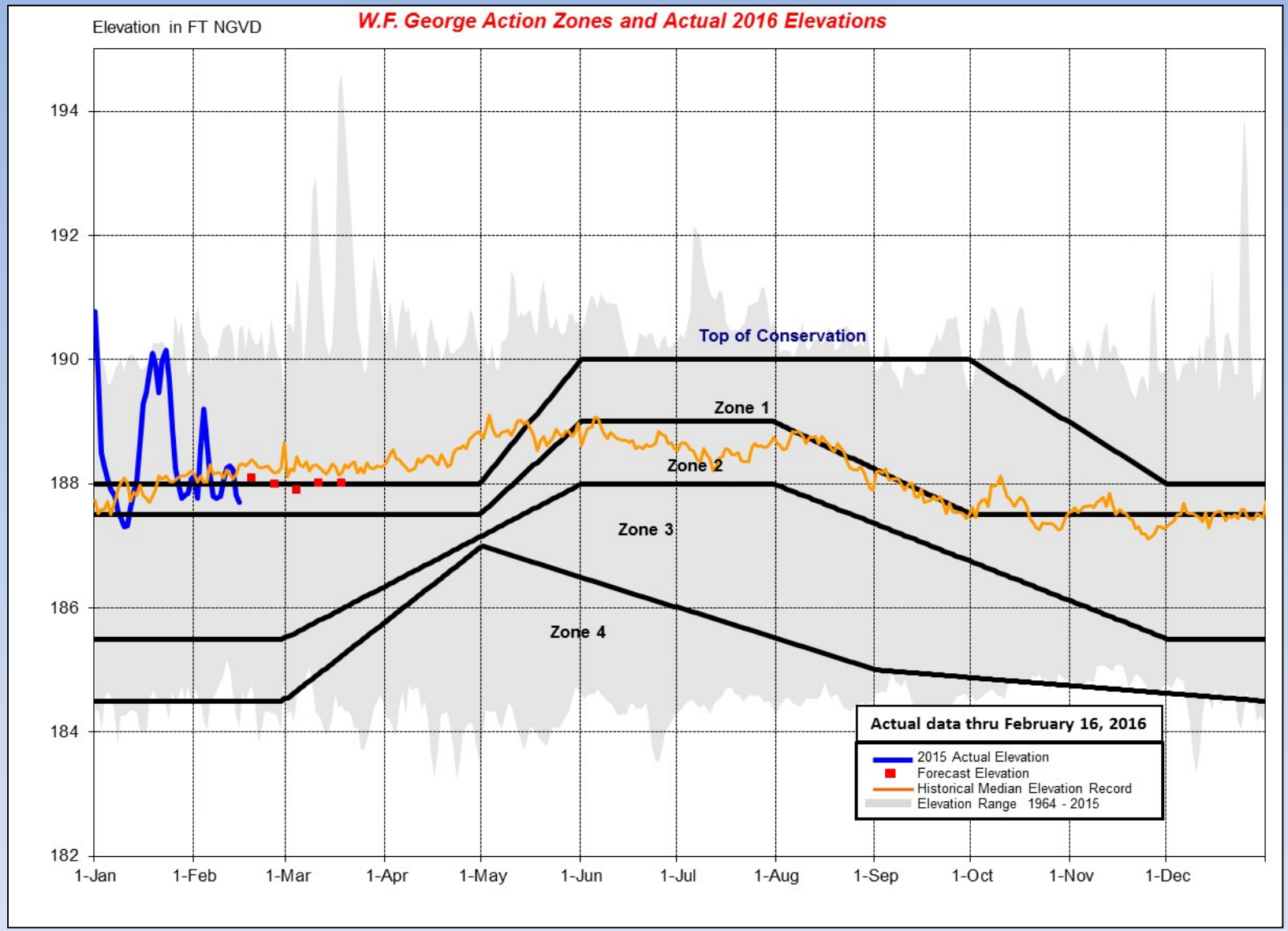
SouthEast River
SERFC
Forecast Center

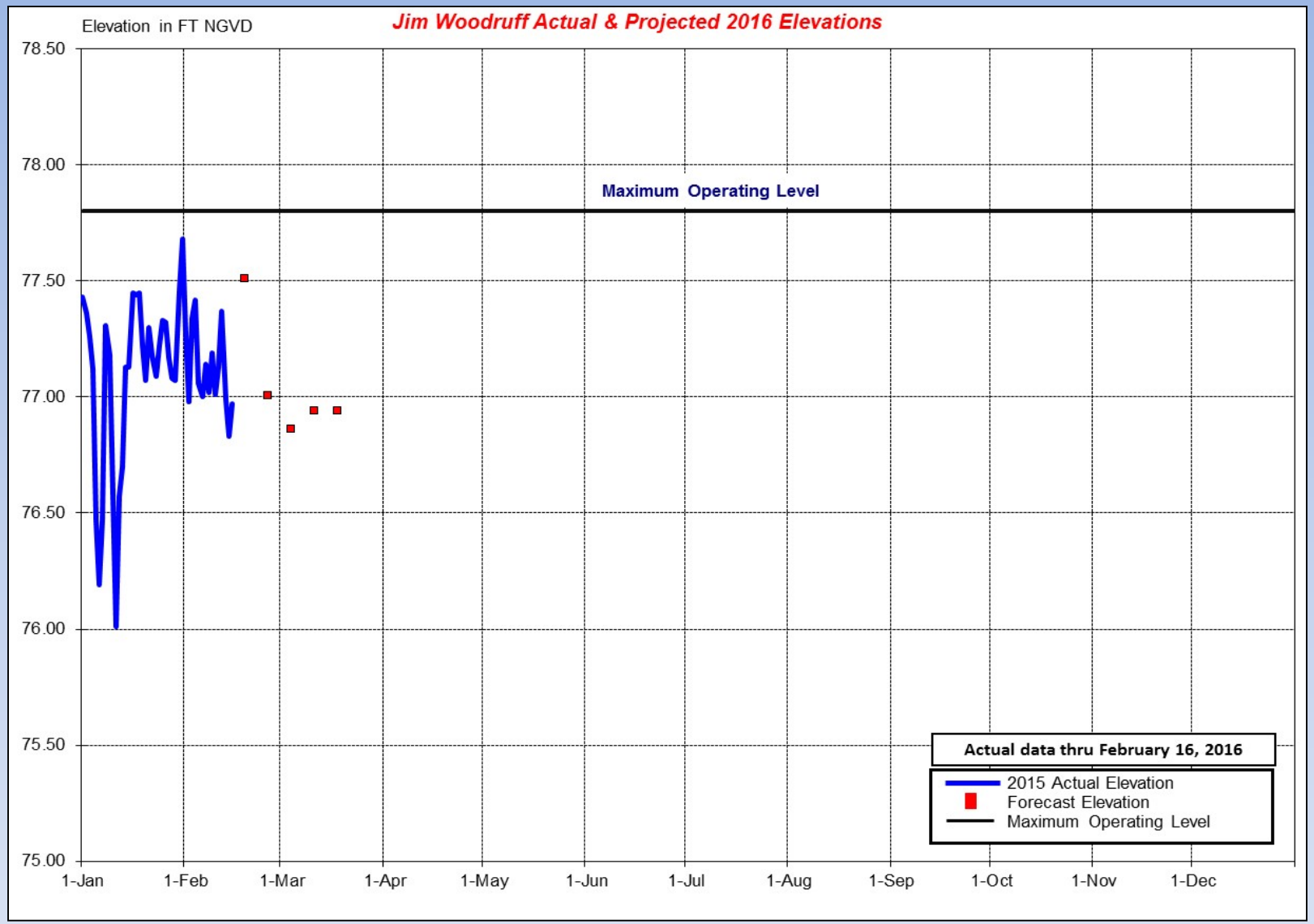
USACE – ACF Reservoir Conditions February 2016

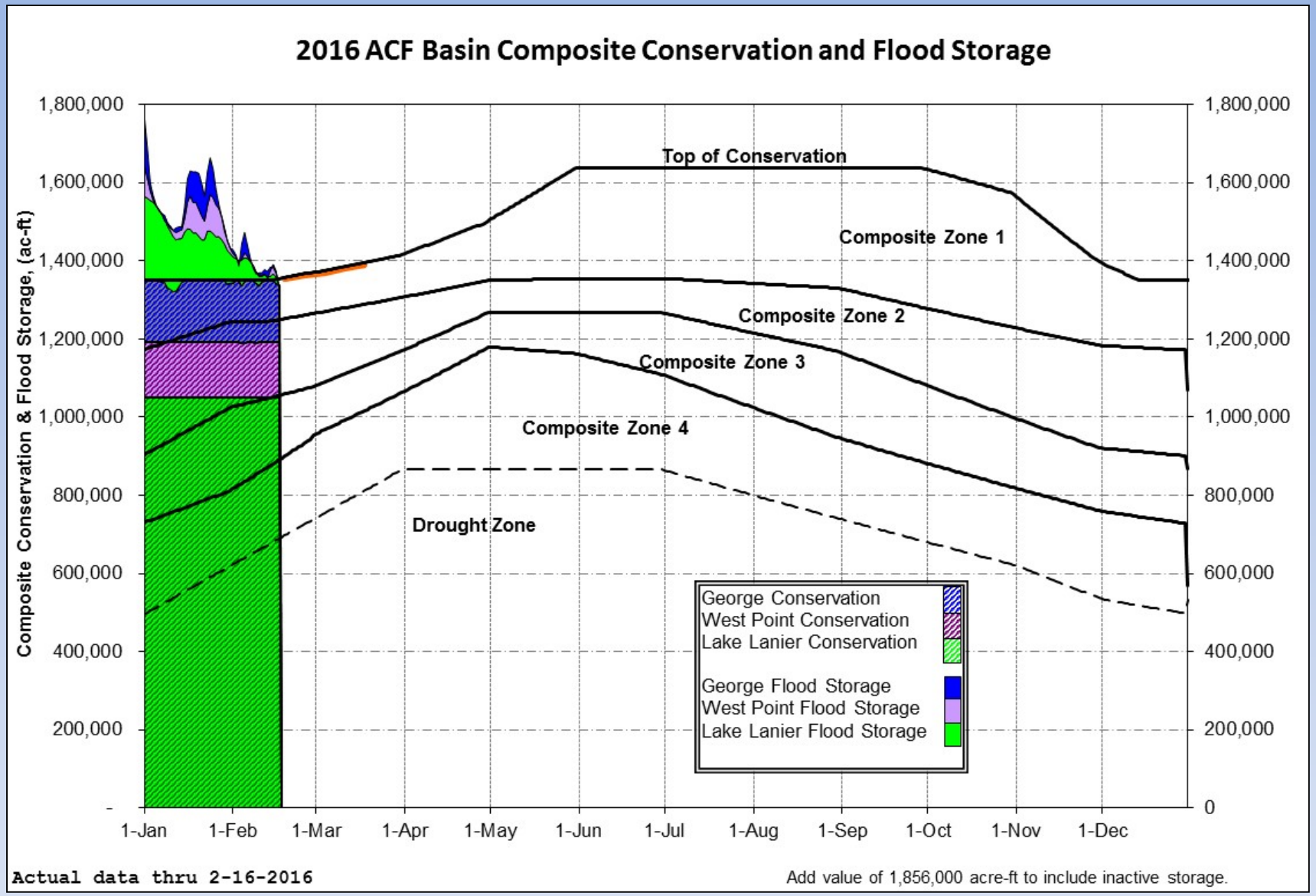
Bailey Crane


Elevation in FT NGVD
Lanier Action Zones and Actual 2016 Elevations
1080.00
1075.00
1070.00
1065.00
1060.00
1055.00
1050.00
1045.00
1040.00
1035.00
Top of Conservation
Zone 1
Zone 2
Zone 3
Zone 4
Bottom of Conservation
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
Actual data thru February 16, 2016
2015 Actual Elevation
Forecast Elevation
Historical Median Elevation
Elevation Range 1960 - 2015


West Point Action Zones and Actual 2016 Elevations
Elevation in FT NGVD
640
638
636
634
632
630
628
626
624
622
620
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
Top of Conservation
Zone 1
Zone 2
Zone 3
Zone 4
Bottom of Conservation
Actual data thru February 16, 2016
2015 Actual Elevation
Forecast Elevation
Historical Median Elevation
Elevation Range 1975 - 2015


Elevation in FT NGVD
W.F. George Action Zones and Actual 2016 Elevations
194
192
190
188
186
184
182
Top of Conservation
Zone 1
Zone 2
Zone 3
Zone 4
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
Actual data thru February 16, 2016
2015 Actual Elevation
Forecast Elevation
Historical Median Elevation Record
Elevation Range 1964 - 2015


Elevation in FT NGVD
Jim Woodruff Actual & Projected 2016 Elevations
78.50
78.00
77.50
77.00
76.50
76.00
75.50
75.00
Maximum Operating Level
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
Actual data thru February 16, 2016
2015 Actual Elevation
Forecast Elevation
Maximum Operating Level


2016 ACF Basin Composite Conservation and Flood Storage
Composite Conservation & Flood Storage, (ac-ft)
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
Top of Conservation
Composite Zone 1
Composite Zone 2
Composite Zone 3
Composite Zone 4
Drought Zone
George Conservation
West Point Conservation
Lake Lanier Conservation
George Flood Storage
West Point Flood Storage
Lake Lanier Flood Storage
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
Actual data thru 2-16-2016
Add value of 1,856,000 acre-ft to include inactive storage.

Summary – Bailey Crane

- All ACF federal reservoirs are at or near full winter pool
- The ACF system is expected to remain top of conservation through the winter
- West Point has begun its seasonal refill, targeting 635 on June 1st
- Slightly higher than normal releases continue as the Corps maintains the pools at their top of winter pool.

Summary – David Zierden

- 2015/16 El Nino possibly the strongest on record, same class as 1982/83 and 1997/98
- Robust El Nino storm track thus far in 2016, leading to flooding rains and severe weather in South Florida
- El Nino likely to decay in coming months, rebound to La Nina possible
- Just because El Nino has peaked does not mean the impacts are over

Summary-Paul Ankcorn

- Realtime range from normal to much above normal for most of the ACF basin, with the majority of streamgages in the above normal to much above normal range.
- 28-day average streamflows into Lake Lanier are in the above normal range.
- 28-day average streamflows for the Flint River are above normal range.
- Groundwater levels are in the above normal range in Southwest Georgia.

Summary – Jeff Dobur

- 1 Month Streamflow forecast - Above Normal.
- 3 Month Streamflow forecast – Favor Above 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.

Questions, Comments, Discussion

References

Speakers

David Zierden, FSU

Paul Ankcorn, USGS

Jeff Dobur, SERFC

Bailey Crane, USACE

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

March 15, 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