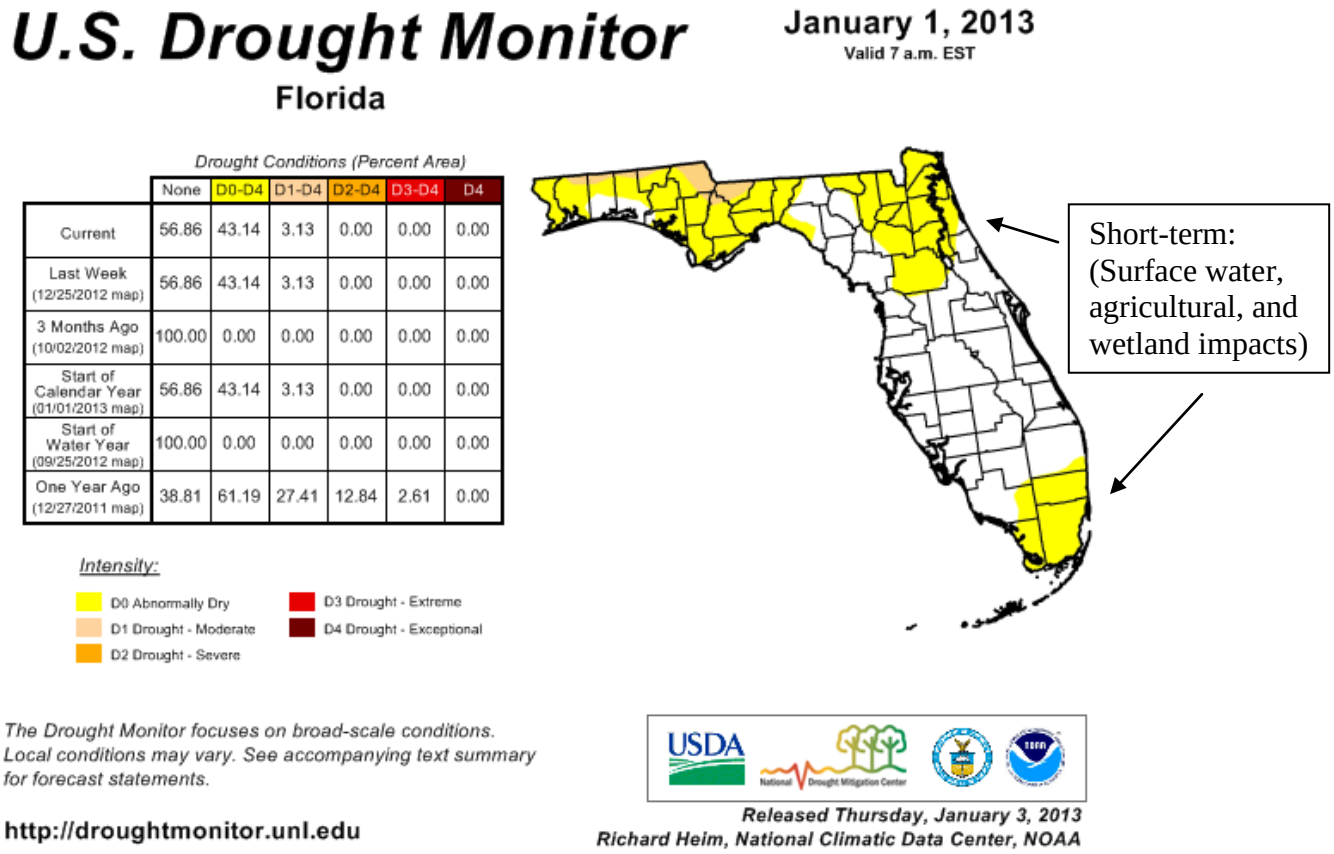
Drought Status and Climate Outlook for Upcoming 12 Months
FWS SFESO – Vero Beach, FL
January 4, 2013

Short Term Drought Map:



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	56.86	43.14	3.13	0.00	0.00	0.00
Last Week (12/25/2012 map)	56.86	43.14	3.13	0.00	0.00	0.00
3 Months Ago (10/02/2012 map)	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year (01/01/2013 map)	56.86	43.14	3.13	0.00	0.00	0.00
Start of Water Year (09/25/2012 map)	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago (12/27/2011 map)	38.81	61.19	27.41	12.84	2.61	0.00

Figure 1 – U.S. Drought Monitor for the State of Florida (Climate Prediction Center, 2013).

Synopsis: During December, dry and warm weather dominated Florida. Precipitation deficits of 4 to 8 inches had accrued across the Florida Panhandle during the first part of December. Following a wet "wet season", most significant rain events during the month missed much of the State. Thus, abnormally dry conditions expanded in south and north Florida to reflect growing surface deficits.

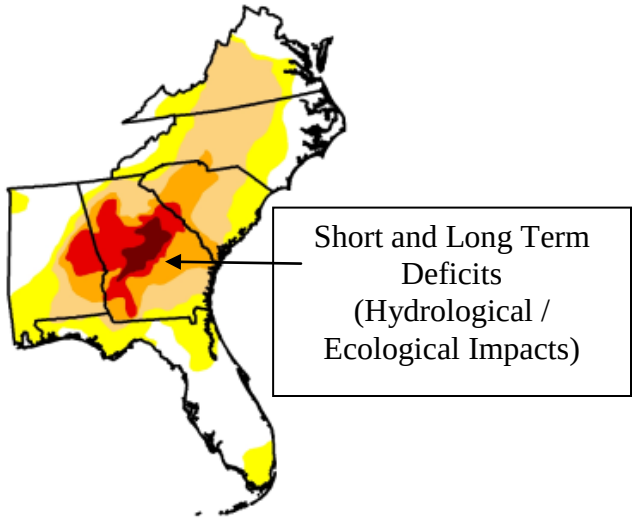
U.S. Drought Monitor

Southeast

January 1, 2013
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	29.15	70.85	45.65	20.64	9.58	2.10
Last Week (12/25/2012 map)	25.07	74.93	49.46	22.47	9.67	3.43
3 Months Ago (10/02/2012 map)	70.32	29.68	15.38	10.02	5.69	1.85
Start of Calendar Year (01/01/2013 map)	29.15	70.85	45.65	20.64	9.58	2.10
Start of Water Year (09/25/2012 map)	66.49	33.51	17.18	11.50	8.53	3.52
One Year Ago (12/27/2011 map)	40.38	59.62	43.05	28.62	18.71	0.00



Intensity:

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

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, January 3, 2013
Richard Heim, National Climatic Data Center, NOAA

Figure 2 – U.S. Drought Monitor for the Southeast Region (Climate Prediction Center, 2013).

Synopsis – In early-December, dry and warm weather dominated the southern and southeastern U.S. Only the Louisiana Delta northeastward through southeastern South Carolina received more than 0.25 inch of rain. Widespread below-normal precipitation was observed during October and November throughout the Southeast Region. Precipitation totals were 2 or more inches below normal almost everywhere in the region, and deficits of 4 to locally 8 inches accrued across most of Mississippi, Alabama, the Florida Panhandle, and the south Atlantic states away from the immediate coast. Abnormally dry conditions developed along the central Gulf Coast and across parts of the Appalachians. Following a wet "wet season", less than 0.5 inch of rain had fallen on the Florida Peninsula since the beginning of November. Moderate drought conditions expanded to cover larger sections of southern Virginia, the Carolinas, and eastern Alabama while severe to exceptional droughts in South Carolina and Georgia increased in areal coverage. Over the last 6 months, precipitation shortfalls of 12 to 20 inches have accumulated in east-central Alabama and at scattered locations in Georgia and the Carolinas. However, in mid-December, a large area of precipitation with amounts from 2 to 3 inches was recorded in Mississippi, Alabama, and Georgia. This helped to bring amounts near normal for the month, but the previous 30 to 60 days still indicated large deficits in many areas. By late-December, a half-inch to locally 2+ inches of rain fell over a large part of the Southeast Region. It did little, however, to erase long-term deficits

which, across large areas, ranged from 4 to 8 inches for the last 90 days, 4 to 12 inches at 6 months, and up to 16 inches for the last 12 months in Georgia and Alabama. However, this rain missed the Atlantic coastal areas and much of Florida. Moderate drought conditions expanded in southeast Georgia and abnormally dry conditions expanded in south and north Florida to reflect growing deficits.

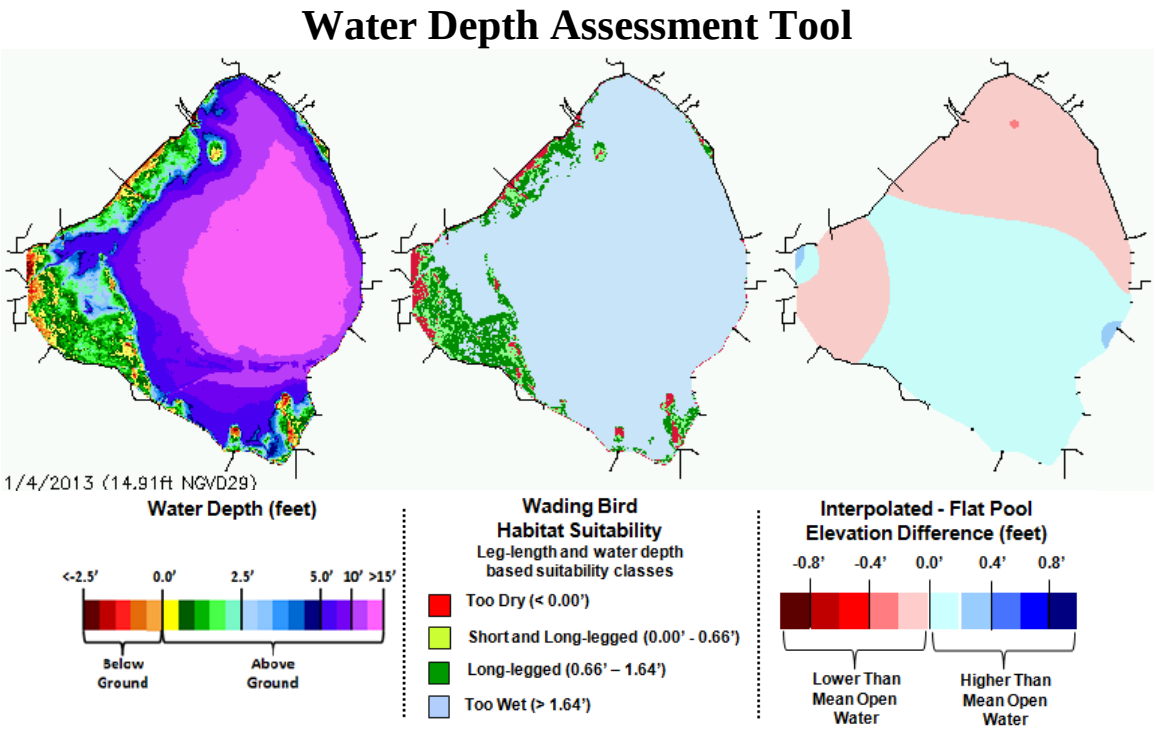


Figure 3 – SFWMD Water Depth Assessment Tool (WDAT) current water depths and wading bird habitat suitability for Lake (South Florida Water Management District, 2013**).**

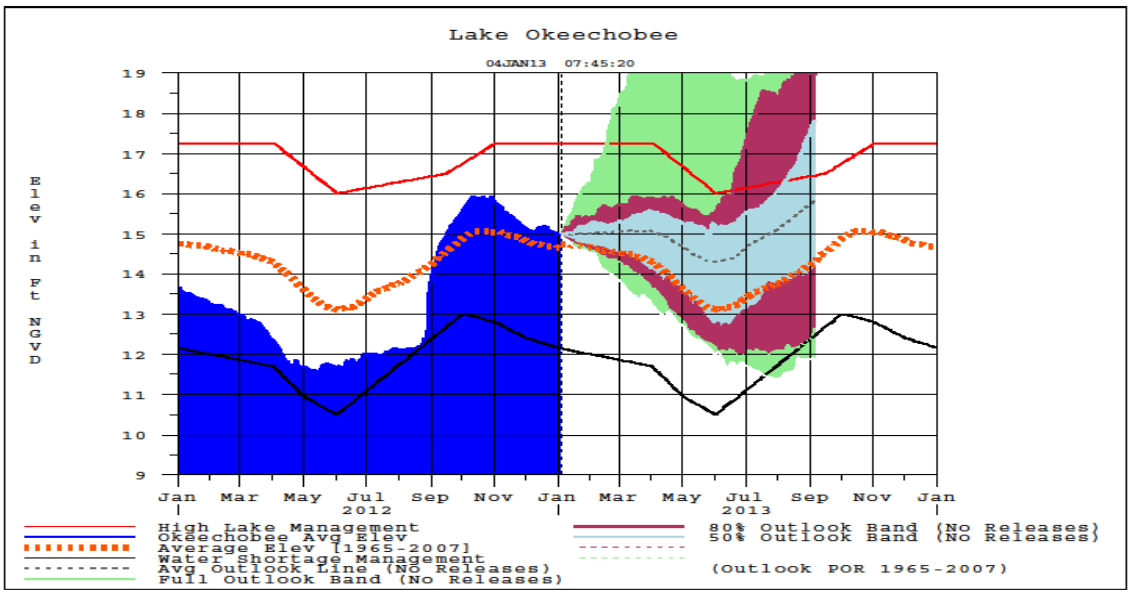


Figure 4 –Current lake levels, management bands, and potential forecast levels (U.S. Army Corps of Engineers, 2013**).**

Everglades
South Florida Water Depth Assessment Tool (SFWDAT)

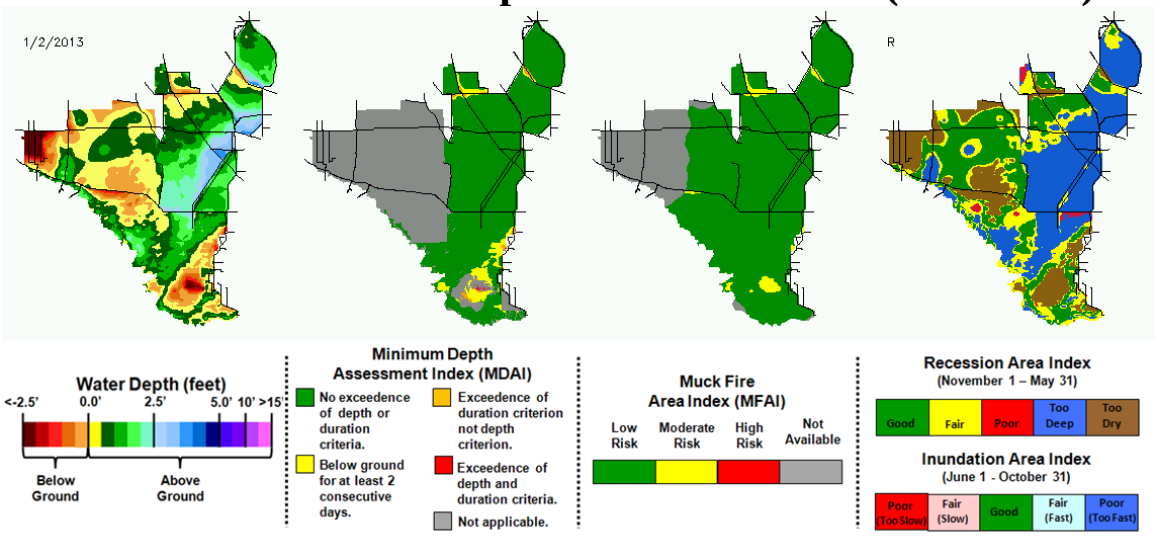


Figure 5 – SFWMD South Florida Water Depth Assessment Tool (SFWDAT) with current water depths, muck fire hazards and wading bird recession rates for the Greater Everglades (South Florida Water Management District, 2013**).**

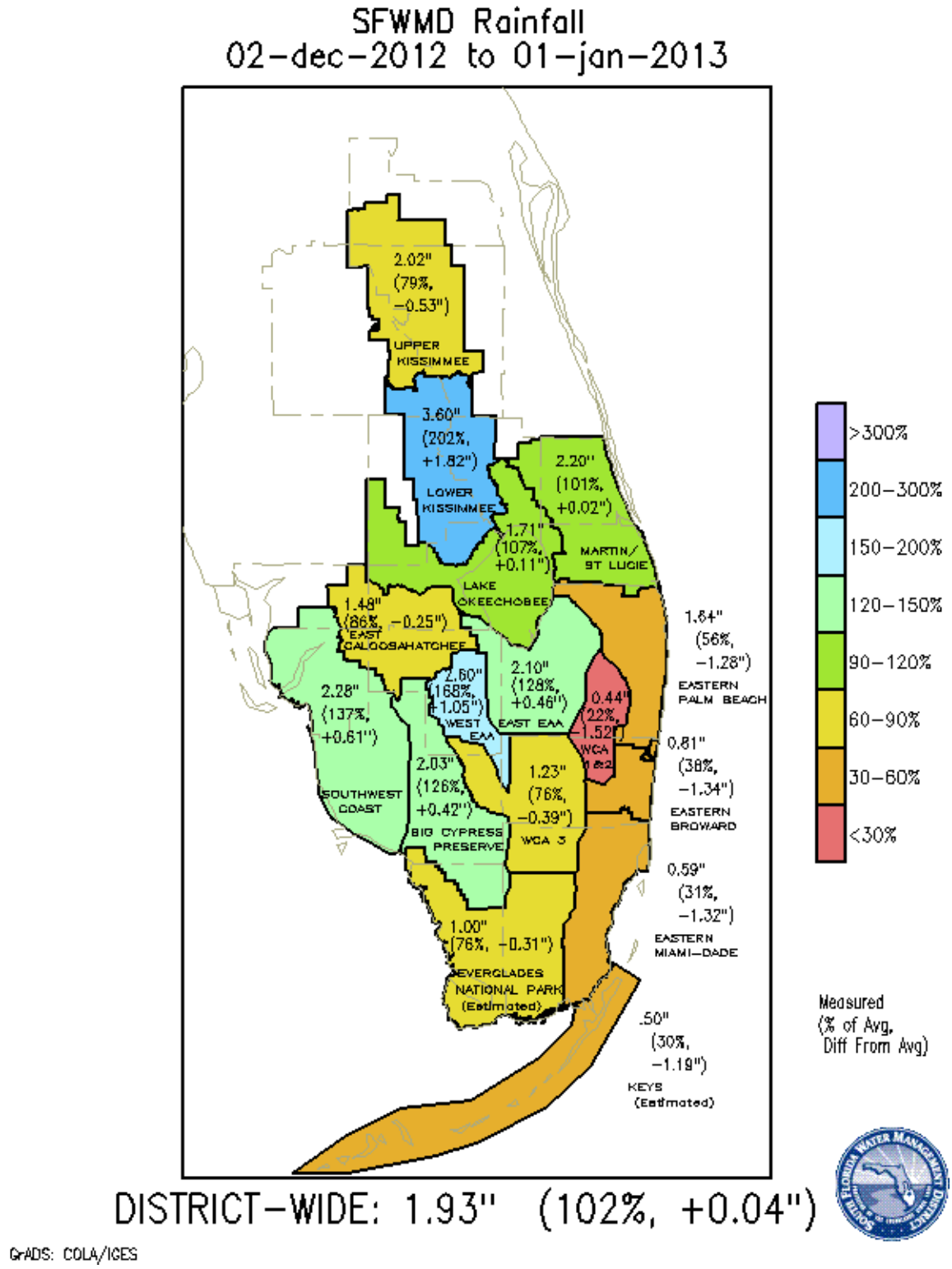


Figure 6 – South Florida Water Management District rain totals for the month of December 2012. Abnormally dry conditions have developed in the upper Kissimmee basin, the Caloosahatchee basin, WCA-3, and ENP (South Florida Water Management District, 2013)**.**

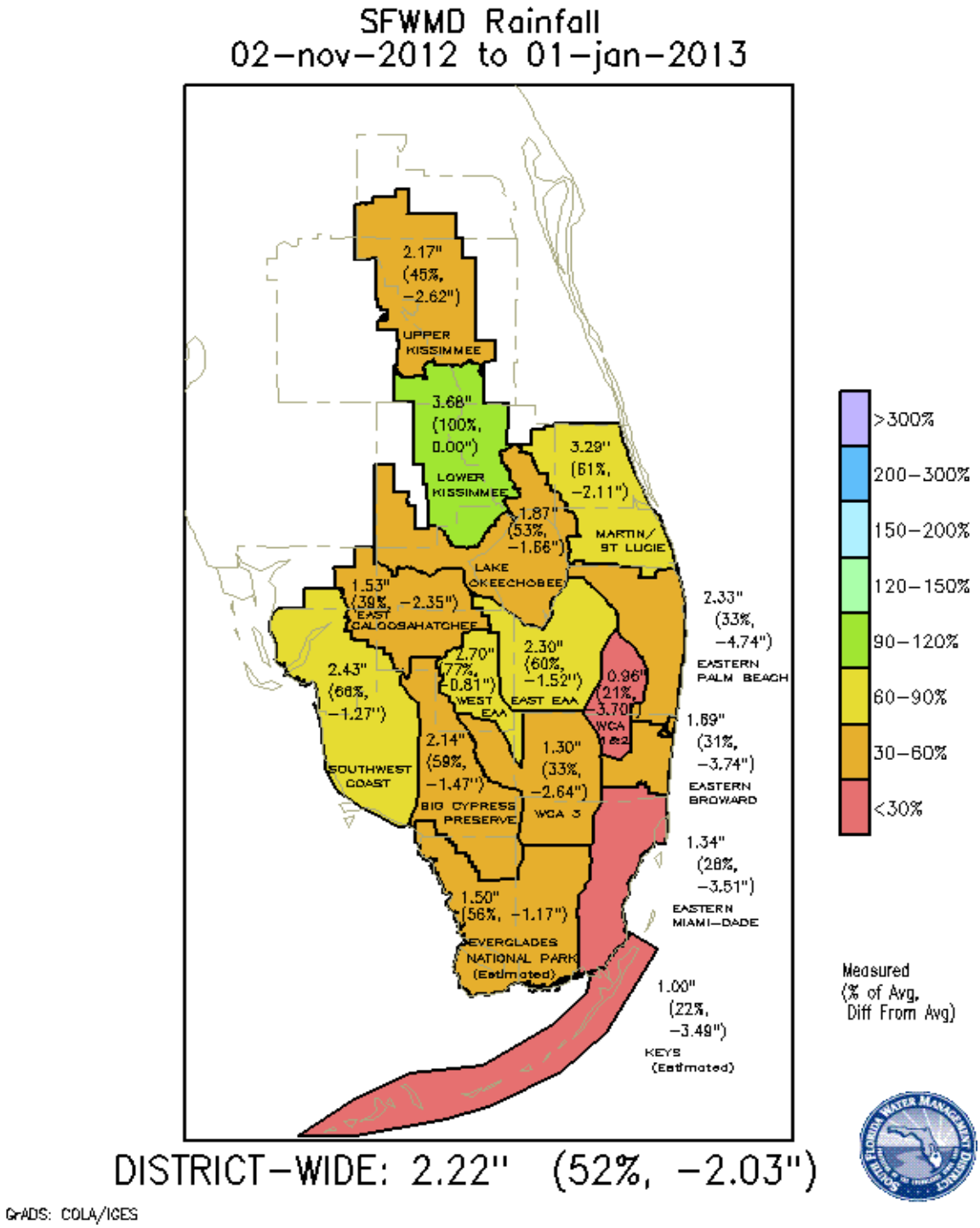


Figure 7 – South Florida Water Management District Dry Season rainfall totals from November 1 to present with abnormally dry conditions for most areas (South Florida Water Management District, 2013)**.**

Drought Reporter (Drought Reporter, 2013)**:**
Agriculture:
Dry weather in southern Florida has reduced the size of oranges, driving the price of orange futures 3.2 percent higher. The U.S. Department of Agriculture's forecast for total orange production is 146 million boxes, which is 5 percent lower than October's forecast. Minneapolis-St. Paul Star Tribune (Minn.), Dec. 12, 2012

Drought Outlook for the Next 3 Months:

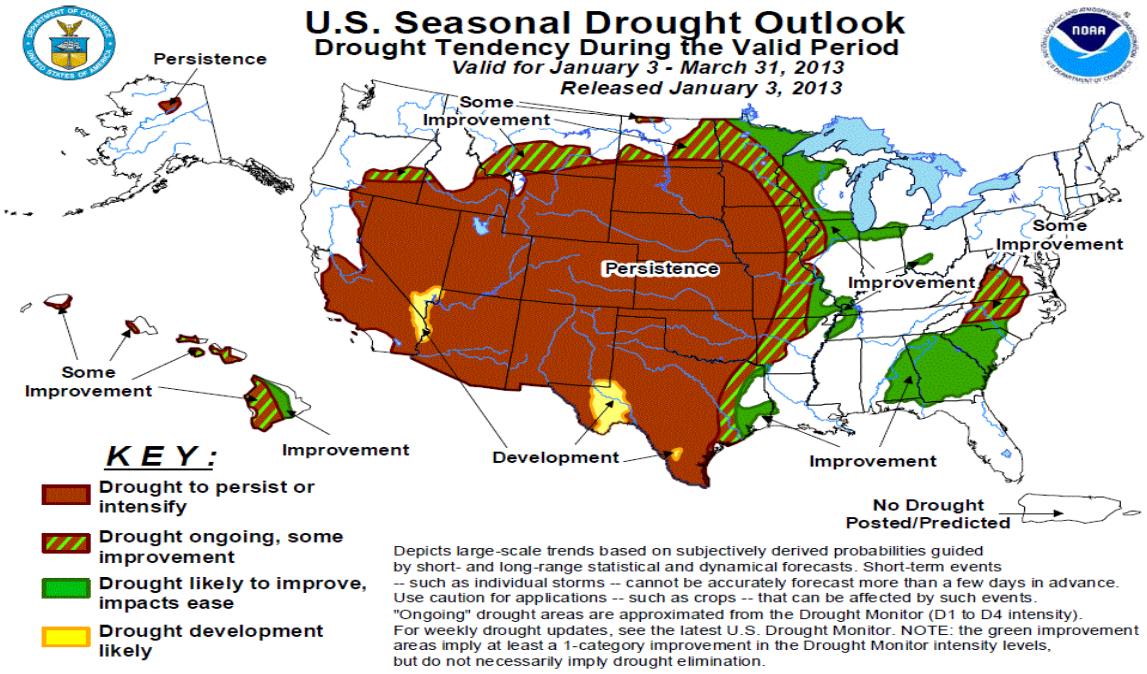


Figure 8 – Drought Outlook for the next 3 months (Climate Prediction Center, 2013)**.**

El Nino / La Nina (ENSO) Status

Highlights - ENSO-neutral is expected for the 2012-13 dry season.

Neutral ENSO conditions persist in the tropical Pacific Ocean (Australian Government - Bureau of Meteorology, 2013). Climate indicators of the El Niño-Southern Oscillation (ENSO) remain within neutral values. Sea surface temperatures in the tropical Pacific are generally close to the long-term average (see Figure 9). Atmospheric indicators, such as the Southern Oscillation Index (SOI), trade winds and cloudiness near the Date Line have fluctuated in recent weeks, but generally remained within the neutral range.

The majority of the climate models indicate that the tropical Pacific is likely to remain neutral through the winter months (see Figure 10).

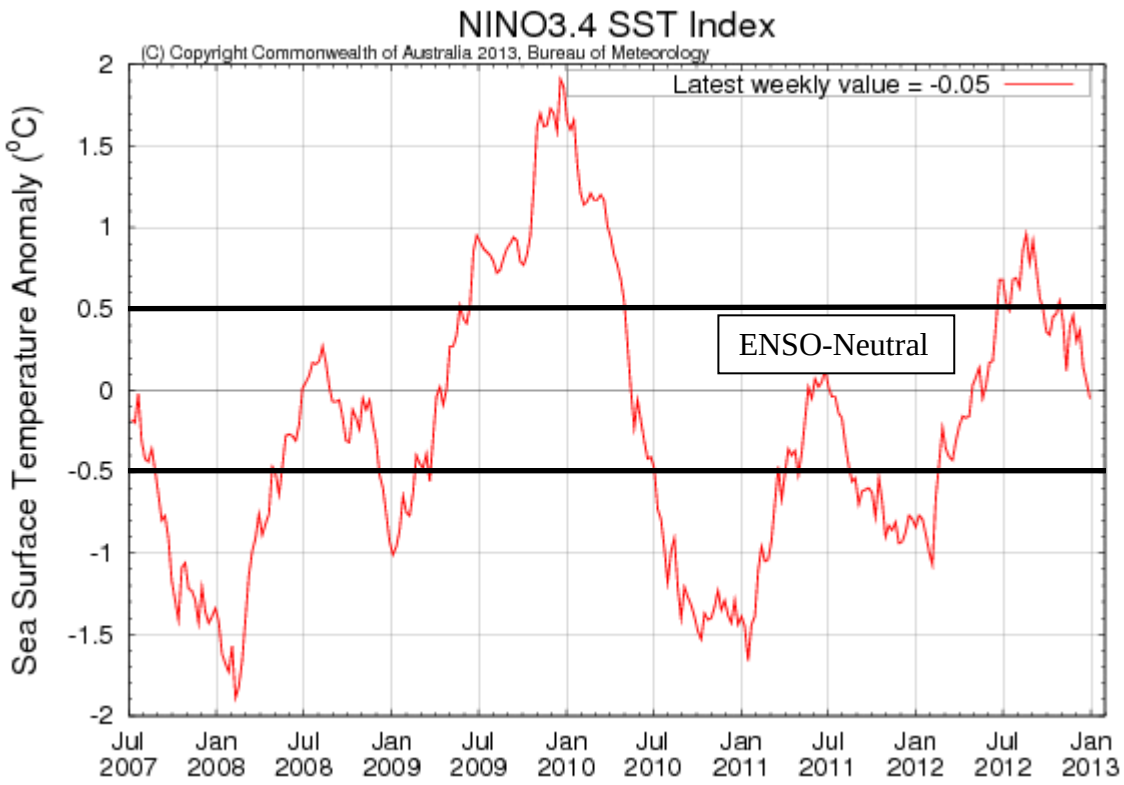


Figure 9 – Sea Surface Temperatures (SST) for Nino 3.4 region of the Pacific Ocean (Australian Government - Bureau of Meteorology, 2013**).**

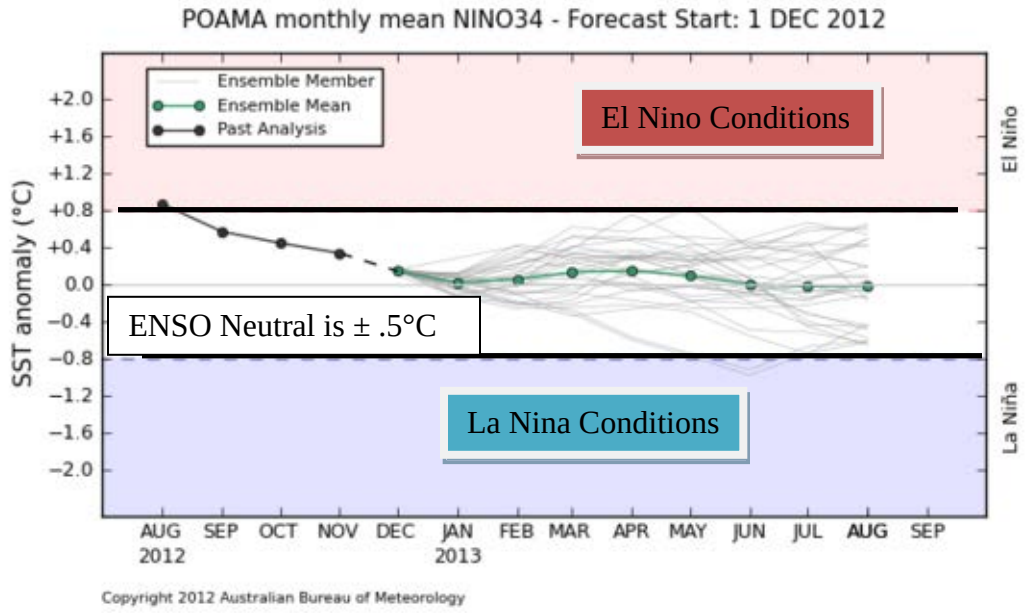


Figure 10 - All climate model runs from December 2012. The green line is climate forecaster's preferred dynamical model average indicating ENSO-Neutral conditions through the upcoming months (Australian Government - Bureau of Meteorology, 2013**).**

Expected ENSO-Neutral effects for Florida include:

- Jet streams are occasionally farther south leading to a cooler winter with the possibility of short duration cold periods.
- Average dry season rainfall.
- Average surface water elevations during the dry season.
- Average fires.
- Average hurricane activity in the upcoming hurricane season.

2013 Hurricane Season Discussion:

December 7, 2012 - Drs Gray and Klotzbach, of Colorado State University, are providing a preliminary qualitative discussion of features likely to impact the 2013 Atlantic basin hurricane season (Klotzbach, 2012). They have developed a new way of assessing next year's activity in terms of two primary physical parameters:

1. the strength of the Atlantic Thermohaline Circulation (THC)
2. the phase of ENSO

We have been in an active era for Atlantic basin tropical cyclones since 1995 when the warm phase of the Atlantic Multi-Decadal Oscillation (AMO) began. Typical conditions associated with a warm AMO and strong thermohaline circulation (THC) are expected to continue through 2013. The term *thermohaline circulation (THC)* refers to a part of the large-scale ocean circulation that is driven by global surface heat, freshwater fluxes, and salt content of water (Wikipedia, 2012). Wind-driven surface currents (such as the Gulf Stream) travel pole wards from the equatorial Atlantic Ocean, cooling en route, and eventually sinking at high latitudes. Extensive mixing therefore takes place between the ocean basins, reducing differences between them and making the Earth's oceans a global system. The thermohaline circulation is sometimes called the great ocean conveyor (see Figure 11).

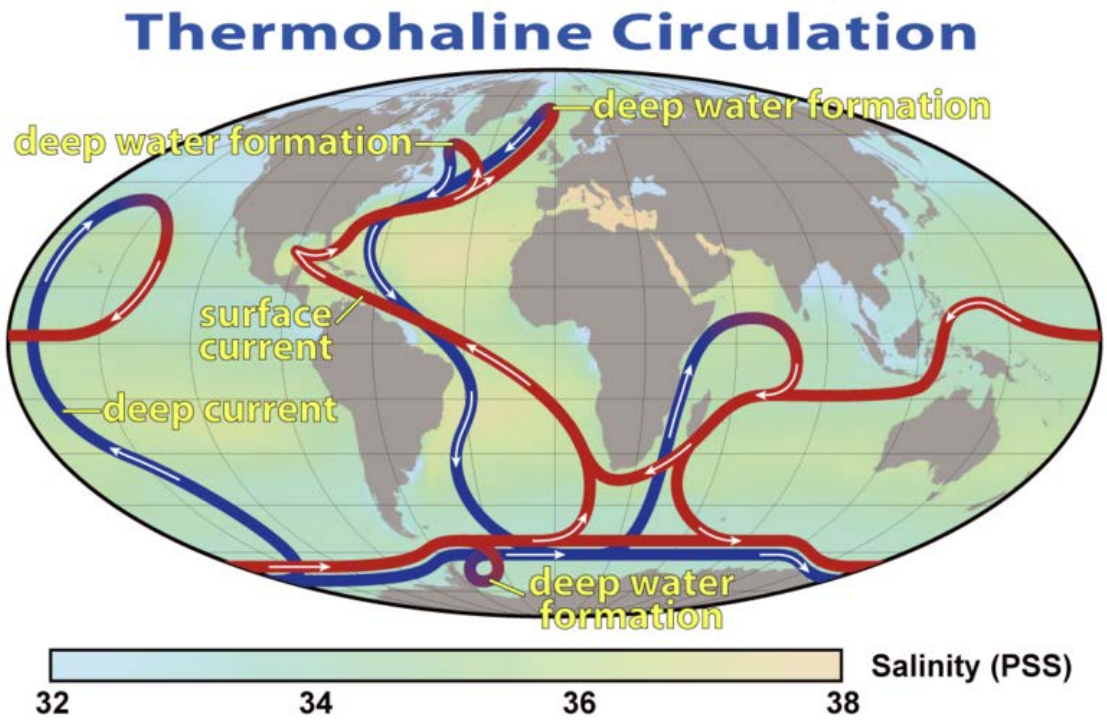


Figure 11 - A summary of the path of the thermohaline circulation/ Great Ocean Conveyor. Blue paths represent deep-water currents, while red paths represent surface currents.

One of the big challenges for 2013 is whether or not El Niño will develop for the 2013 hurricane season. Since El Niño never fully developed in 2012, and we have since returned to neutral conditions, there is the possibility that an El Niño event will develop next year. Given the persistent negative North Atlantic Oscillation (NAO) and positive thermohaline circulation (THC) conditions, tropical Atlantic sea surface temperatures (SSTs) will likely be warmer than average next spring. Thus, the 2013 Atlantic basin hurricane season will be primarily determined by the strength of the THC/AMO and by the state of ENSO.

2013 Hurricane Outlook:
As mentioned in the previous discussion, we will likely remain in a warm phase of the AMO (an active era for Atlantic basin tropical cyclones), and consequently, if El Niño does not develop, an active 2013 season is likely. However, given the current statistical analysis, it appears that there is a moderate chance (30-50%) that El Niño will develop for the 2013 Atlantic basin hurricane season. The first quantitative forecast will be available April 10, 2013.

Central & South Florida Temperature Outlook:
January – Much Warmer than Average
February thru April - Average
May – Warmer than Average
June thru September – Much Warmer than Average
October – Warmer than Average
November thru December - Average

Central & South Florida Rainfall Outlook:
January - Below Average
February thru December – Average

Lori Miller – FWS Hydrologist - 772.469.4231

Works Cited

Australian Government - Bureau of Meteorology. (2013, January 3). *Climate and Past Weather*. Retrieved January 4, 2013, from Australian Government - Bureau of Meteorology: http://www.bom.gov.au/climate/enso/

Climate Prediction Center. (2013). Retrieved from Climate Prediction Center: http://www.cpc.ncep.noaa.gov/index.php

Drought Reporter. (2013). *Drought Reporter*. Retrieved from Drought Reporter: http://droughtreporter.unl.edu/

Klotzbach, P. a. (2012). *QUALITATIVE DISCUSSION OF ATLANTIC BASIN SEASONAL HURRICANE ACTIVITY FOR 2013.* Fort Collins, CO: Department of Atmospheric Science, Colorado State University.

South Florida Water Management District. (2013). *South Florida Water Depth Assessment Tool (SFWDAT) - Everglades Implementation*. Retrieved from South Florida Water Depth Assessment Tool (SFWDAT) - Everglades Implementation: http://my.sfwmd.gov/KMLEXT/CUSTOMKMLS/SFWDAT/everglades/output/animations/animation365.html

South Florida Water Management District. (2013). *Water Depth Assessment Tool (WDAT) - Lake Okeechobee*. Retrieved from http://my.sfwmd.gov/KMLEXT/CUSTOMKMLS/SFWDAT/okeechobee/output/animations/animation365.html

South Florida Water Management District. (2013). *Weather and Water*. Retrieved from Weather and Water: http://www.sfwmd.gov/portal/page/portal/levelthree/weather%20%20water

U.S. Army Corps of Engineers. (2013). *SAJ Water Management Graphical Plots*. Retrieved from SAJ Water Management Graphical Plots: http://w3.saj.usace.army.mil/h2o/plots.htm

Wikipedia. (2012, December 19). *Thermohaline Circulation*. Retrieved January 4, 2013, from Wikipedia: http://en.wikipedia.org/wiki/Thermohaline_circulation