

# **EXTREME DROUGHT 2006-2008**

An oppressive, long-term drought lasting from late March of 2006 until late August of 2008 impacted the entire state of Florida, with costly consequences in residential water usage, public utilities, the agricultural industry, outdoor recreation, and tourism. Lake Okeechobee reached an all-time record minimum water level of 8.82 feet on July 2, 2007 (Figure 1); the Kissimmee River did not flow for eight months; groundwater levels fell within range of historic records; and outflow to many waterways abated. Groundwater recharge to aquifers struggled with little precipitation and the absence of impacting tropical cyclones. 2007 ranked the lowest annual Palmer Drought Severity Index (PDSI) value since established records in 1895.

## **VERY LITTLE WATER IN SIGHT**

“If you can imagine 3 feet of rainfall over this lake [Lake Okeechobee] anytime soon, we would still be in a drought,” said Chip Merriam, deputy executive director of the South Florida Water Management District of Lake Okeechobee.

*The Palm Beach Post, May 2, 2007*



Figure 1. Lake Okeechobee, June 2007, Mike Theiss.



This touchstone event summary highlights an exceptional weather event, the extreme drought of 2006-2008, and related health outcomes in Florida. Utilizing the Florida Climate Extremes Index, technical reports, and newspapers, a touchstone event was identified for this priority hazard. It is important to note that these reports were not validated with vital statistics or notifiable disease surveillance data. Experiences and memories from historical events can highlight the importance of public health preparedness and adaptation planning.

# Extreme Drought 2006-2008

# METEOROLOGICAL SET-UP

» By spring 2007, the Bermuda High was parked well into the southeastern U.S. Not only did this cause prolonged stagnant, sunny conditions and suppress precipitation, but any relief from impending tropical cyclones would be most likely blocked from Florida (Figure 2).

» By July 2007, a La Niña cycle had set in, which has tendencies of reduced precipitation and dryness in Florida.

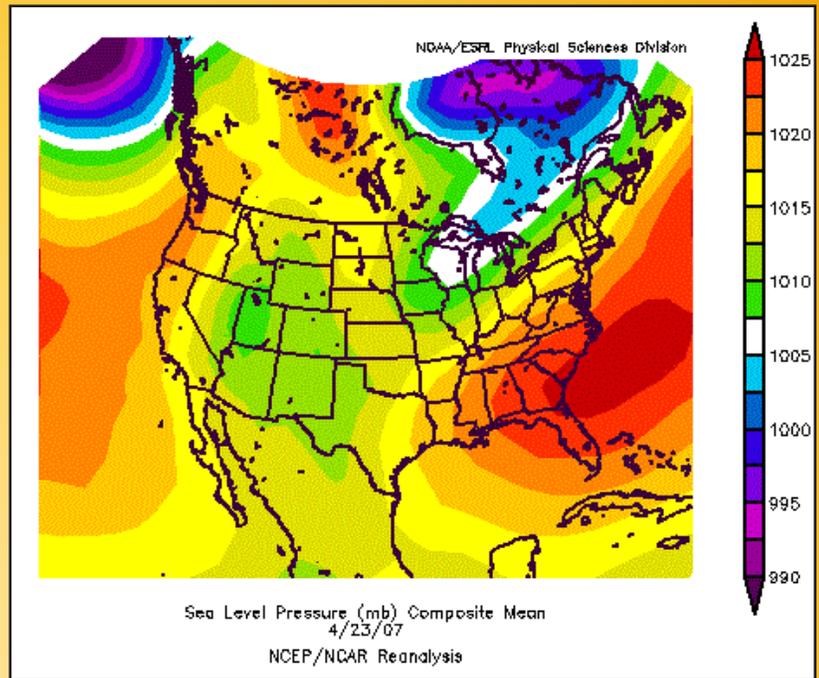


Figure 2. Mean sea level pressure (mb), April 2007  
Earth Systems Research Laboratory, NOAA

Over the entire three-year period, significant drought was felt at some point in every region of Florida. However, the most extensive, severe, continuous moisture deficit occurred in north Florida and the South Florida Water Management District.

Figure 3 is a snapshot of drought conditions for the last week of May 2007, showing some of the driest conditions of the three-year period. Over 30% of all of Florida remained in “Extreme Drought” conditions for the second week in a row, while over 66% of Florida experienced “Severe Drought,” also for the second week in a row.

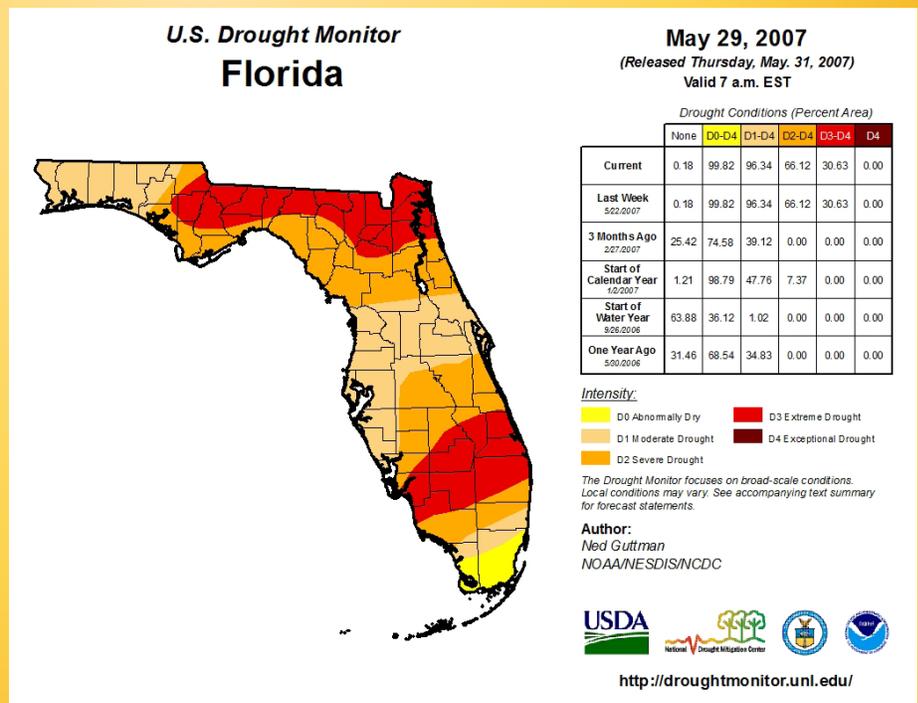


Figure 3. U.S. Drought Monitor, week of May 29, 2007, National Drought Mitigation Center.



# Extreme Drought 2006-2008

# RECORDS

» 2006 was reported as Florida's third driest year since established records in 1895 (Figure 4).

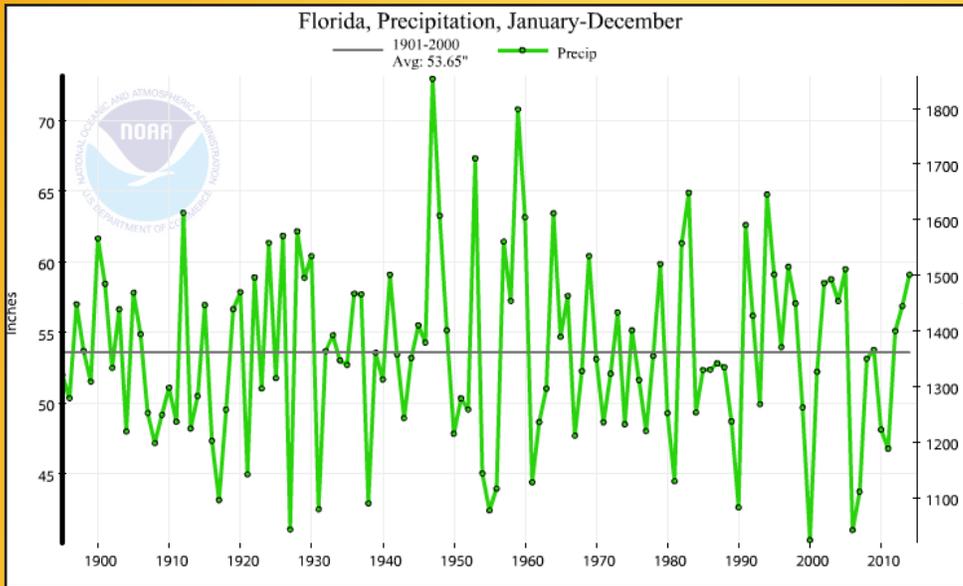


Figure 4. Annual Precipitation, Florida 1950-2013, *National Climatic Data Center (NCDC)*.

» Due to low rainfall amounts in 2007, portions of the South Florida Water Management District experienced a drought expected to occur once every 100 years.

» Portions of the Suwannee River Water Management District reported a 30-inch rainfall deficit in May 2007.

» Statewide, 2007 has been recorded as the lowest year on the Palmer Drought Severity Index since established records in 1895 (Figure 5).

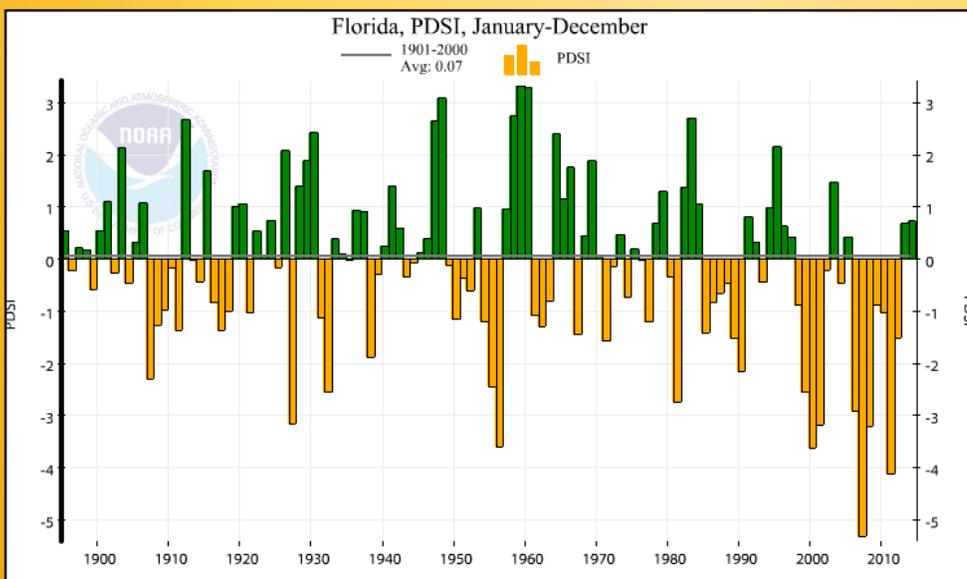


Figure 5. Annual Palmer Drought Severity Index (PDSI), Florida 1895-2013, *NCDC*.

» Florida experienced record low inflows, outflows, and discharges of rivers, estuaries, and small waterways, including Lake Okeechobee, the Kissimmee River, Lake Istokpoga, St. Lucie Canal, Caloosahatchee Canal, Everglades National Park, and many water conservation areas.



## Extreme Drought 2006-2008

# LAKE OKEECHOBEE

Lake Okeechobee reached an all-time record minimum water level of 8.82 feet on July 2, 2007 (Figure 6). However, this historic level provided a unique opportunity, which allowed Lake Okeechobee to undergo beneficial treatment. State water managers lead \$7 million in projects to improve the lake, which included



Figure 6. Lake Okeechobee, May 2007. *The New York Times*.

planting native and aquatic plants, as well as cleaning the bottom of muck, invasive species, and debris (partially due to recent active hurricane seasons). This treatment reduced pollution in the water, and increased the health and revival of plants, wildlife, and fish populations.

## IMPACTS

Although large concerns of water shortages, decreased water quality, and increased disease incidence were present, this drought was an important lesson in water management. Economical, resource, environmental, and ecosystem impacts were felt all across Florida. Much initiative came from this event, pushing for stronger drought resilience, improving water usage efficiencies, developing alternative supplies, as well as planning and regulation management.

- » Water restrictions and burn bans were put into effect.
- » Many Florida residents reported well failures from extremely low groundwater levels.
- » Florida experienced large seasonal unemployment from reductions in tourism and outdoor recreation.
- » Construction and landscaping were halted, sometimes in the middle of projects.

Without sufficient crop irrigation, reductions in citrus, sugarcane, and livestock mounted heavily. This not only lost income for farmers, but increased unemployment for migrant workers. Dry and windy conditions continually made wildland fires a threat, burning many acres across Florida.



# DROUGHT VULNERABILITY IN FLORIDA

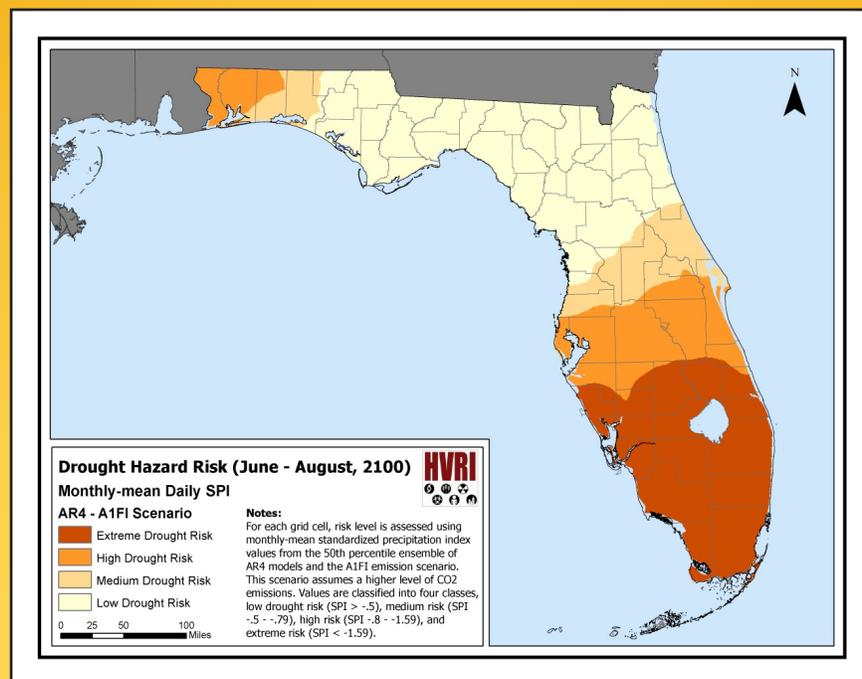


Figure 7. Extreme drought vulnerability maps. Source: C. Emrich, University of South Carolina Hazards and Vulnerability Research Institute, 2014.

Florida has historically been vulnerable to drought, although this hazard takes a different form in the state than in other parts of the continental U.S. Projected increases in dry days and warmer temperatures could lead to more persistent drought in the future.

Drought vulnerability in Florida was quantified using the Standardized Precipitation Index (SPI) and assessed with statistically downscaled projections using three scenarios: low (B1), middle (A1B), and high (A1FI). Monthly-mean daily SPI from these downscaled projections were used to create spatial representations of future drought hazard areas by the year 2100 for summer (June-August) and annually. Four drought risk categories (extreme, high, medium, and low) were used.

Under the high scenario (Figure 7), approximately 7.7 million people in 15 counties are at extreme risk of summer drought. South and central Florida and the western Panhandle are most at risk. Locations that are both physically and socially vulnerable are places where a combination of hazard and social adaptation practices can maximize positive outcomes. For outcomes for each case scenario, please see the Florida BRACE Vulnerability Assessment Report.

For more information, please contact the Florida Department of Health BRACE Program or visit [www.floridahealth.gov](http://www.floridahealth.gov).