



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

NEWS RELEASE

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Sequence Matters: Some Plants Prefer Drought Before Flood

New SFWMD research may aid Everglades restoration efforts

West Palm Beach, FL – When it comes to the extremes of floods and droughts, some tree seedlings on Everglades tree islands would rather cope with a drought first and then a flood, rather than the other way around.

This new insight will be particularly important for the Everglades. Ongoing efforts to restore and manage plant communities require managers to integrate their regulation of water flow, which they can control, with periodic droughts and floods, which they cannot. The findings will also help the District manage resources amid predictions of increasingly severe droughts and floods associated with climate change.

The new findings by the South Florida Water Management District's Dr. ShiLi Miao and her colleagues from the University of Arizona and Oklahoma State University were recently published in the journal of *The American Naturalist*.

The experimental greenhouse work documents plant preferences in a study that will have significant implications for predicting how vegetation responds to weather extremes, including future climate change. Success of the ongoing restoration and future management of the Everglades and other aquatic systems will rely heavily on an understanding of tree island dynamics.

The District employs models to monitor and predict the Everglades ecosystems response to various hydrological regimes. Currently, most modeling efforts are based largely on a constant hydrological condition, either flood or drought.

“There were two interesting things that we found out,” Dr. Miao said. “First, you can't really predict how the plants will respond to combinations of drought and flood by studies that look just at a single drought or a single flood. Second, the plants respond very differently depending on the sequence of flood and drought.”

The researchers studied three plant species commonly found on Everglades tree islands: *Bursera simaruba*, a relatively drought-tolerant species; *Annona glabra*, a flood-tolerant species; and *Acer rubrum*, a species with intermediate tolerance to both drought and flood relative to the other two species.

As expected, tree seedlings have a higher survival under optimum hydrological conditions. With regard to extreme events such as drought or flood, seedlings have a better chance of survival if they begin in a drought and then become flooded, rather than vice versa, the new research shows.

Researchers are already struggling with improving predictions of how extreme conditions like droughts and floods kill plants. The new research highlights that the challenge ahead includes evaluating different sequences of extreme events.

Dr. Miao and her team plan to conduct additional research on various wetland plants related to their nutrient removal function under extreme hydrological conditions.

Below are pictures of the research in action.

- [Photo 1](#)
- [Photo 2](#)
- [Photo 3](#)

For more on Everglades restoration efforts, visit the District's website at: www.sfwmd.gov

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About the South Florida Water Management District – [Celebrating 60 Years \(1949-2009\)](#)

The South Florida Water Management District is a regional, governmental agency that oversees the water resources in the southern half of the state – 16 counties from Orlando to the Keys. It is the oldest and largest of the state's five water management districts. The agency mission is to manage and protect water resources of the region by balancing and improving water quality, flood control, natural systems and water supply. A key initiative is cleanup and restoration of the Everglades.