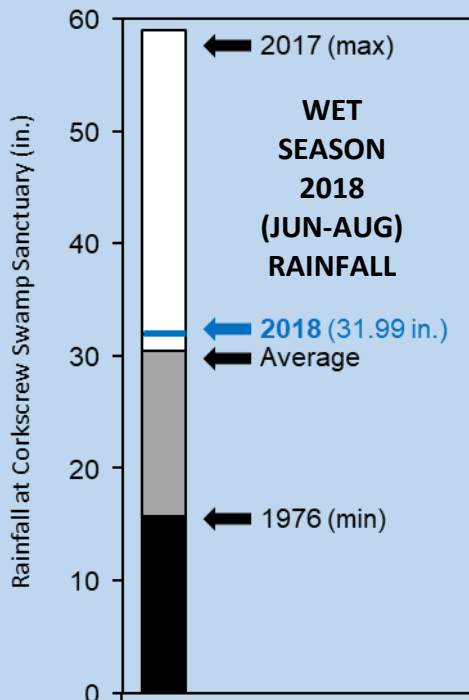
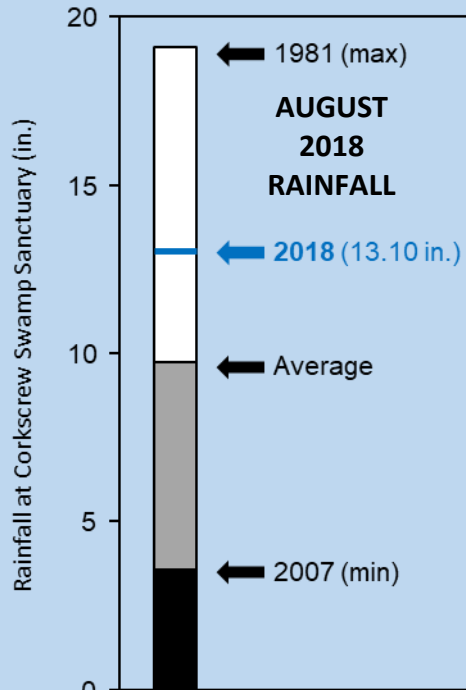


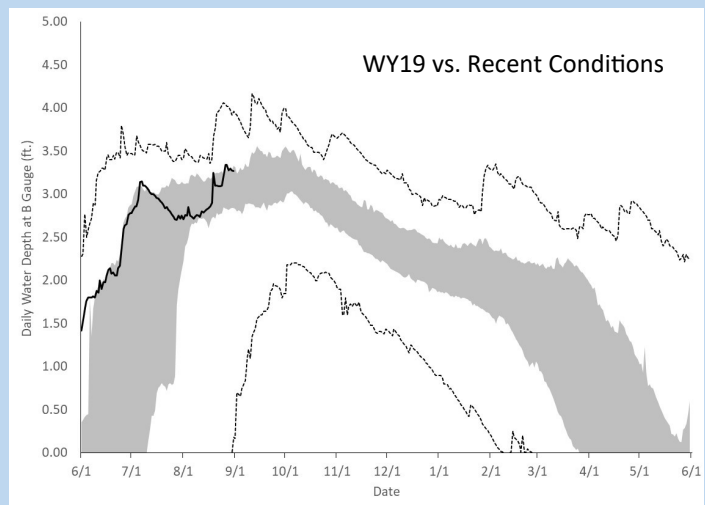
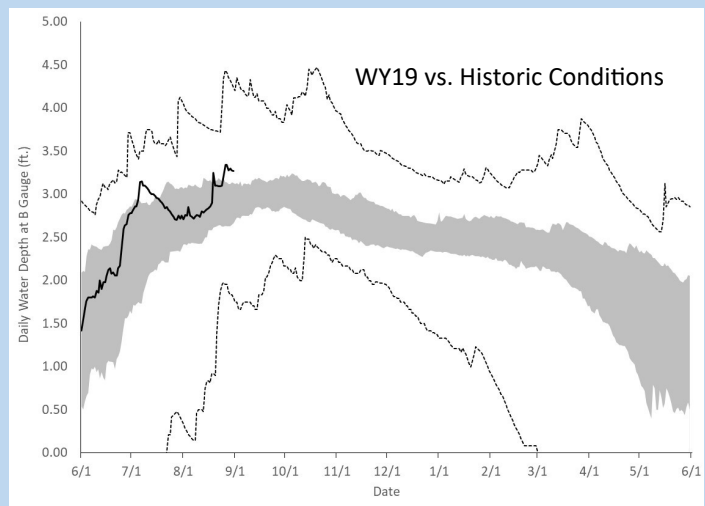
# Research Update



## Hydrologic Conditions



**CURRENT WATER LEVEL: 3.36 ft. (9/1/18)**



— WY19  
..... Daily record max & min  
Range of 'typical' years (25-75 percentile)

*This publication is for Corkscrew Swamp Sanctuary staff, volunteers and other friends. All reported data should be considered preliminary. Please contact Dr. Shawn Clem ([sclem@audubon.org](mailto:sclem@audubon.org)) with questions.*

## Lessons from Hurricane Irma

### Comparisons between Hurricane Donna (1960) and Hurricane Irma (2017) highlight Corkscrew's troubling water loss

Fifty-eight years ago today (September 10, 1960) Hurricane Donna made landfall south of Naples, Florida as a category 4 storm, its eye passing a few miles west of Audubon's Corkscrew Swamp Sanctuary. One year ago today (September 10, 2017) Hurricane Irma arrived as a category 3 storm, its landfall and track through Southwest Florida eerily similar to that of Hurricane Donna. Long-term monitoring data collected by Audubon staff from these two storms demonstrate how similar these two storms really were and support recent research that detected a troubling loss of water from the swamp.

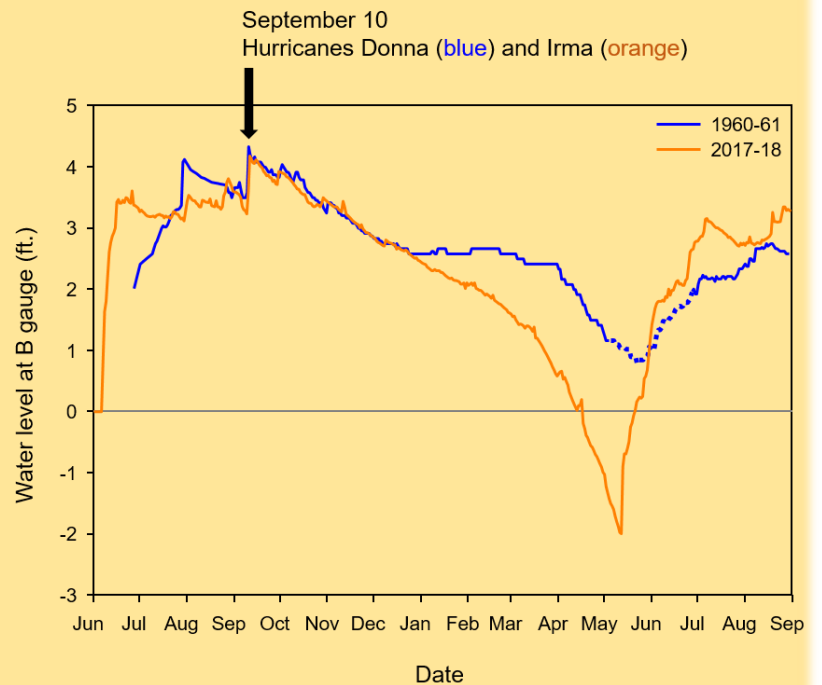
Hurricane Donna brought 5.6 inches of rainfall to Corkscrew, raising water levels at the 'B' staff gauge (in our north Lettuce Lake) to 4.33 feet. Donna's high water mark has only been surpassed only twice in our 61-year continuous hydrologic record – in August and then October of 1995 when Tropical Storm Jerry and Hurricane Opal delivered a one-two punch of tropical weather to Southwest Florida.

Last year, Hurricane Irma dropped 12.6 inches of rainfall in the sanctuary which brought water levels to 4.17 feet, our fourth-highest water level on record. Interestingly, in the wet season leading up to the September 10 storms we received nearly twice as much rain in 2017 than we did in 1960 (June-August 1960 rain = 30.6 inches, June-August 2017 rain = 59.0 inches). So despite record-breaking rainfall in the summer of 2017, maximum water levels recorded at Corkscrew Swamp Sanctuary following Hurricane Irma were within a few centimeters of the peak water levels following Hurricane Opal, Tropical Storm Jerry, and Hurricane Donna. Audubon scientists hypothesize that this peak represents the maximum water storage capacity of the swamp. In other words, if you picture the swamp like a bowl, this is the point where the bowl is full and any additional water spills across the regional landscape and cannot be held by the swamp.

In the two to three months following Hurricanes Donna and Irma, water levels in Cork-

Record high water levels recorded at Corkscrew Swamp Sanctuary's 'B' staff gauge, 1957 to 2018.

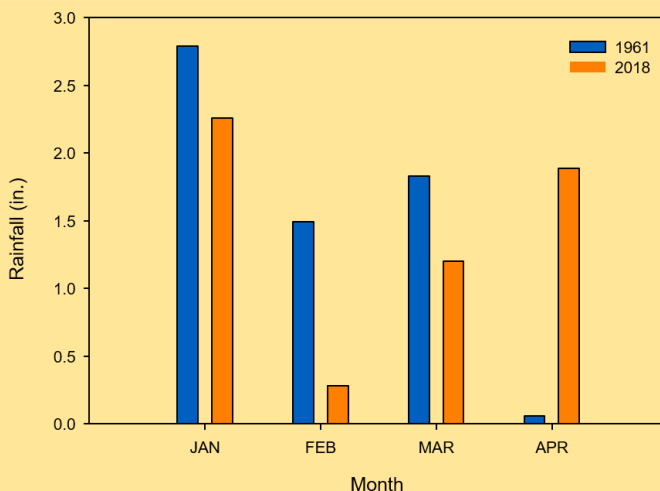
Rank	Storm (year)	Maximum water level at 'B' gauge (ft.)
1	Hurricane Opal (1995)	4.47
2	Tropical Storm Jerry (1995)	4.44
3	Hurricane Donna (1960)	4.33
4	Hurricane Irma (2017)	4.17
5	Tropical Storm Fay (2008)	4.06



Water level in Corkscrew's Lettuce Lakes in 1960-61 and 2017-18 (zero is ground level at the B gauge). Arrow indicates the September 10 arrival of Hurricane Donna and Hurricane Irma, respectively. Dashed line represents estimated water depths when data were missing.

screw's Lettuce Lakes receded quite similarly. After January 1, however, big differences became apparent. This past year, in the dry season that followed Hurricane Irma, water levels fell much faster and the water table dipped much lower than we saw after Hurricane Donna. This perceived "drier dry season" in early 2018 was despite record-breaking wet season rainfall and despite relatively typical monthly dry season rainfall.

**So where did our water go?** This is a question that has been troubling our research staff since we first detected this annual over-drying trend several years ago (see our [Research Report](#) for more details). Our data analyses suggest that regardless of wet season conditions, since 2000 we have dried down faster and stayed dry for longer than we ever did historically. This hydrologic change has tremendous implications for our plants and wildlife (including Corkscrew's iconic Wood Storks), the integrity of our natural habitats, and even Corkscrew's risk for devastating wildfires. Our team believes the change may be due to some combination of land cover changes, ground water withdrawals, and water management practices, but more research and modeling are needed. We continue to utilize long-term monitoring as a tool for understanding change in our ecosystem, exploring options for further analyses to elucidate hydrologic changes and understand implications, and working with our policy team to ensure we're doing everything we can to protect this extraordinary ecosystem.



Monthly rainfall January through April following Hurricanes Donna (blue) and Irma (orange).

## Update from Picayune Strand —

In August our team completed the first of three aquatic fauna monitoring trips as part of the Picayune Strand Restoration Project (PSRP). This joint effort with partners at Florida Gulf Coast University and Johnson Engineering, Inc. is examining tree frog, aquatic invertebrate, and fish populations three years following the first completed phase of the PSRP.

In addition to the sites in Picayune Strand, sites in Fakahatchee Strand Preserve State Park and Florida Panther National Wildlife Refuge serve as reference sites for this study. Audubon Research Technician Lee Martin is serving as crew leader for this cooperative project.





## Welcome Interns!

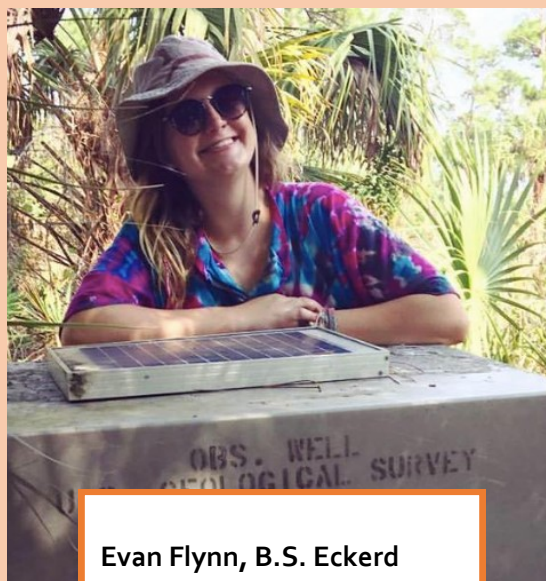
In the past month or so we've been joined by three new Conservation Interns who will be assisting with both research and land stewardship projects over the next six months. It's an exciting time for Western Everglades research— we're so happy to welcome to these enthusiastic young ecologists and conservationists on our team!



**Lara Jones, B.A. Wellesley  
College (Biological Sciences)**



**Randi Bowman, B.S. Lewis-  
Clark State College  
(Biology)**



**Evan Flynn, B.S. Eckerd  
College (Marine Geology)**

Read more about our [current](#) and [former](#)  
Conservation Interns on our website.



### OUR TEAM:

Dr. Shawn Clem, Research Manager

Lee Martin, Research Technician

Conservation Interns: Amada Bressoud,  
Evan Flynn, Lara Jones & Randi Bowman