



## 2017 Wading Bird Nesting in the Everglades:

*Restoring the hydrology-prey-foraging relationship in the Everglades is key to successful wading bird nesting in South Florida*

The 2017 wading bird nesting season produced some of the highest nest counts in a decade, with a total of 46,248 nests which represents a moderate improvement from the 10-year annual average of 39,065 nests, according to the 2017 South Florida Wading Bird Report. This report is produced annually by the South Florida Water Management District with contributions from Audubon Florida scientists<sup>1</sup>.

Hydrological conditions in 2017 were almost ideal throughout most of the Everglades ecosystem. The 2017 nesting season (Dec. 2016 to July 2017) was preceded by a very wet summer, followed by a brief drought at the onset of the dry season (winter-to-spring). These back-to-back weather extremes recreated similar pre-drainage conditions in the Everglades, where propagation of prey fish during the wet season followed by a natural drawdown in marshes during the dry season resulted in a reliable source of food for populations of wading birds to feed their young throughout the entire nesting season.

In the areas where water levels receded on a timeframe that mirrored historic recession rates, the birds responded favorably by nesting in large numbers. However, areas like Lake Okeechobee where the water levels dropped too rapidly to support Everglade Snail Kite breeding efforts, and Audubon's Corkscrew Swamp Sanctuary where the water levels dropped too soon to ensure Wood Stork nesting success, exemplify the reason why full-scale restoration is needed to achieve more natural drawdown patterns and full recovery of the wading bird super-colonies that characterize the River of Grass.

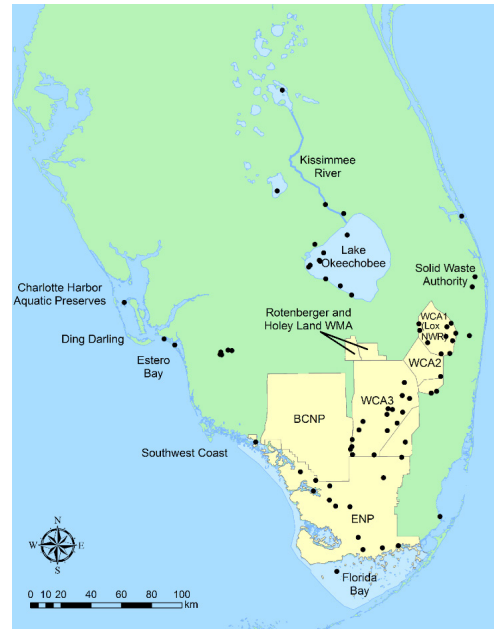
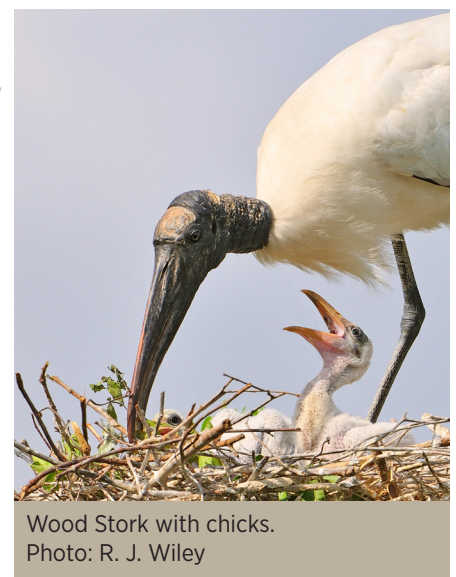


Figure 1. Location of wading bird colonies with  $\geq 50$  nests in South Florida, 2017. Credit: SFWMD

Wading birds are vital indicators of ecosystem health. Tracking changes in their numbers and nesting patterns are some of the primary tools used by Audubon scientists to evaluate the success of Everglades restoration.

## Key Findings of the 2017 South Florida Wading Bird Report

- ⇒ **The success of 2017 the wading bird nesting season was characterized by water flows that in some places mimicked historic pre-drainage hydropatterns in the Everglades.** In places where water levels replicated historic hydropatterns, wading bird nesting increased. However some areas dried too soon for sustained use, as seen at Audubon's Corkscrew Sanctuary and the Kissimmee River floodplain, and for late season nesters (like *Egretta* species) who ran out of habitat prematurely. Similarly, areas like Florida Bay that depend on improved freshwater flows to support historic large Roseate Spoonbill breeding colonies, still show decline. Water storage projects that can release water throughout the entire dry season are critical to preventing premature dry outs and restoring the hydrology-prey-foraging relationship in the Everglades needed to achieve full wading bird reproduction success in the entire watershed.
- ⇒ **Wood Storks nested in large numbers in 2017 with a total of 3,894 nests throughout South Florida, including nesting at Audubon's Corkscrew Swamp Sanctuary.** The 2017 total nesting almost doubled the 10-year average (2,127). The return of Wood Stork nesting to Corkscrew Swamp is welcome news, demonstrating that the birds will respond when conditions are favorable. The 250 nests produced in the Sanctuary pale in comparison, however, to historic numbers approaching 7,000 nests in the 1960s. The steep decline in suitable Wood Stork foraging habitat in SW Florida demonstrates the need to protect and restore remaining short-hydroperiod wetlands surrounding this ecological gem.



Wood Stork with chicks.  
Photo: R. J. Wiley

<sup>1</sup> South Florida Wading Bird Report. Cook, Mark I. and Baranski, Michael, Eds. Volume 23. February 2018. ([www.sfwmd.gov](http://www.sfwmd.gov))

# 2017 Wading Bird Nesting in the Everglades:

*Restoring the hydrology-prey-foraging relationship in the Everglades is key to successful wading bird nesting in South Florida*

- ⇒ **Roseate Spoonbill nesting in 2017 (460 nests) approached the 10-year average (461.7 nests), however the 207 nests in Florida Bay was one of the lowest breeding season totals since the beginning of data collection.** Some Spoonbills continue to shift nesting to the central freshwater Everglades Water Conservation Areas (WCAs) with 170 nests found at inland colonies in WCAs during 2017. In contrast to recent years, the majority of Spoonbills that nested in Florida Bay nested in their historic island colonies, rather than on the mainland adjacent to Florida Bay. This is an improvement over recent conditions, but the overall trend in Florida Bay Spoonbill colonies continues to deteriorate, due to rapid changes to the ecology of the bay.
- ⇒ **While most species of wading birds exhibited increased or average nesting efforts in 2017, the smaller *Egretta* heron species (Little Blue Heron, Snowy Egret, and Little Blue Heron) continue to exhibit consistent and steep decline,** representing a general reduction in overall nesting effort in the Everglades by these species. Reasons for this sharp decline are poorly understood and a cause for concern. More research is needed to understand what management actions could be taken for their recovery.
- ⇒ **The Great Egret, Snowy Egret, White Ibis, Tricolored Heron, Wood Stork, and Roseate Spoonbill are used to evaluate Everglades restoration progress.** Only Great Egret and White Ibis met 3-year average numeric restoration goals.
- ⇒ **Lake Okeechobee continues to support Snowy Egrets and Tricolored Herons, while Everglades nesting numbers continue to drop for the small *Egretta* herons.** Snowy Egrets and Tricolored Herons have been consistently below restoration targets in the Everglades Protection Area since 1986. In 2017, Lake Okeechobee hosted 951 Snowy Egrets nests, 71% of all South Florida nests and 454 Tricolored Herons nests, 54% of all South Florida nests. This highlights the importance of optimal Lake management, but raises concerns about other areas that are failing to support successful nesting for these species.

## Nesting By Region: Highlights

### Northern Everglades

#### *Kissimmee River and Chain of Lakes*

- ⇒ In 2017, 1,185 wading bird nests were recorded in the Kissimmee Valley, which is close to average of recent years.

An extreme spring drought dried out the Kissimmee floodplain by February and wading birds numbers were low thereafter near the Kissimmee River restoration project. Even with the project not yet finished and hydrology suboptimal, the three-year average of wading birds in the floodplain from 2002-2017 has been more than 100 birds per square mile, exceeding the restoration goal of 80 birds. With project completion scheduled for 2020, much optimism remains that even higher wading bird numbers will be seen in the fully restored floodplain. The largest colony in the region was on Bumblebee Island in Lake Istokpoga, with 998 nests, 818 of which were White Ibis.



Little Blue Heron with chicks.  
Photo: Robert Black

#### *Lake Okeechobee*

- ⇒ An estimated 4,085 wading bird nests were on and around Lake Okeechobee in 2017, about 32% above the 10-year average. A highlight for the Lake in 2017 included 1,550 Glossy Ibis nests.
- ⇒ Nests of the focal species Great Egrets, Snowy Egrets and White Ibis were 19% below recent averages.
- ⇒ There is considerable concern about poor breeding of Snowy Egrets, Tricolored Herons and Little Blue Herons in the Everglades (*Egretta* species). Lake Okeechobee continues to support Snowy Egrets (951 nests) and Tricolored Herons (454 nests) in 2017, representing 71% and 54% of all South Florida nests, respectively.
- ⇒ Lake Okeechobee water levels declined extremely rapidly from March through May, but wading bird nesting was fairly successful. This differed from the response of the endangered Everglades Snail Kite on the Lake and statewide, which had less than 15% of the adults even attempt to breed in spring of 2017.

Breeding numbers on the Lake are also about one and a half times higher under recent lower water level management plans (2006-2017) than they were from 1977 to 1992 when deeper levels severely restricted breeding and caused other harm to the Lake's biota. This highlights the importance of optimal Lake management regimes to ensure no harm comes to the Lake's highly productive marshes that wading birds depend on.

# 2017 Wading Bird Nesting in the Everglades:

*Restoring the hydrology-prey-foraging relationship in the Everglades is key to successful wading bird nesting in South Florida*

## Central Everglades

- ⇒ 27,378 wading bird nests were recorded across the Central Everglades Water Conservation Areas (WCAs), representing an 18% increase over the 10-year average, in part due to the large number of Wood Stork nests (1,046).
- ⇒ 170 Roseate Spoonbill nests were recorded in the WCAs in 2017, which follows a recent trend of inland nesting of Spoonbills in the central Everglades
- ⇒ There is a clear trend of fewer Tricolored Herons and Little Blue Heron nests in WCAs over the past decade, with a 97% reduction of nesting effort for Tricolored Herons in 2017. Causes for the decline are unknown, but an interesting factor that warrants further research is the effect of recent rising colonies of Black-crowned Night Herons (1,230 nesting pairs in 2017) which are likely predators of heron nestlings.

Overall nesting success was high across species and colonies in the Central Everglades, suggesting foraging conditions remained favorable throughout the 2017 wading bird nesting season. The long-term trend shows high variability from year to year, with distinct dominant species. These “year classes” of offspring, including 2017, might play a key role in carrying the population through many years in which recruitment is lower than mortality.

## Western Everglades

- ⇒ Wetter rainy season conditions and significant dry down in the Corkscrew watershed led to a total of 895 wading bird nests across the Western Everglades for the 2017 nesting season. This is a 46% increase from the 2016 effort, mostly attributed to the return of nesting Wood Storks at Audubon’s Corkscrew Swamp Sanctuary.
- ⇒ Wood Storks nested in Audubon’s Corkscrew Swamp Sanctuary for only the second time in 8 years with 250 nests. These are very low numbers compared with overall nesting increases throughout the Everglades at 3,894 nests in 2017, and tiny compared to historical nesting patterns in the many hundreds in the early 2000’s and more than 7,000 in the 1960s. Causes for low nesting include loss of shallow, seasonal wetlands and regional overdrainage.
- ⇒ Although Wood Stork nesting initiated earlier at Corkscrew Sanctuary in 2017, which should increase productivity, most nesting failed due to significant overdrainage of the watershed, a negative regional trend documented by Audubon since just 2000.

The overdrying of the Corkscrew watershed in the dry season in recent years has occurred despite the overall wetter conditions. While wading bird numbers improved in 2017, excessive drainage effects and continued foraging wetland losses limit recovery of Wood Storks. Lack of the historically huge Corkscrew colony recovery threatens the entire Everglades Wood Stork population because of the importance of that historic colony size for the species.

## Southern Everglades

### **Everglades National Park**

- ⇒ In 2017, a total of 7,899 wading bird nests were recorded in Everglades National Park, 22.5% of the total wading bird nests in the Greater Everglades. This is very close to the ten year average but remains far short of the 50% full restoration target.
- ⇒ Wood storks and White Ibis nested in much greater levels than recorded in 2016, increases of 126% and 156%, respectively. Great Egret nesting also increased, by 26%. However, Snowy Egret nesting decreased by 57% compared to 2016.



Roseate Spoonbills with chicks.  
Photo: Cinthya Hansen

### **Florida Bay**

- ⇒ A total of 207 Roseate Spoonbill nests were recorded in Florida Bay in 2017. This is considerably lower than the 367 nests in 2016, and one of the lowest breeding seasons since the beginning of data collection.
- ⇒ Despite low nest numbers, nest productivity was highly successful this year with a much greater number of chicks reaching the branching phase than what is typical.
- ⇒ The mean lay date of January 2 occurred much closer to the traditional historical nesting range, which is an improvement from recent years.



## 2017 Wading Bird Nesting in the Everglades:

*Restoring the hydrology-prey-foraging relationship in the Everglades is key to successful wading bird nesting in South Florida*

- ⇒ In contrast to recent years, the majority of spoonbills nested in their historic colonies on islands in Florida Bay, rather than on the mainland adjacent to Florida Bay.

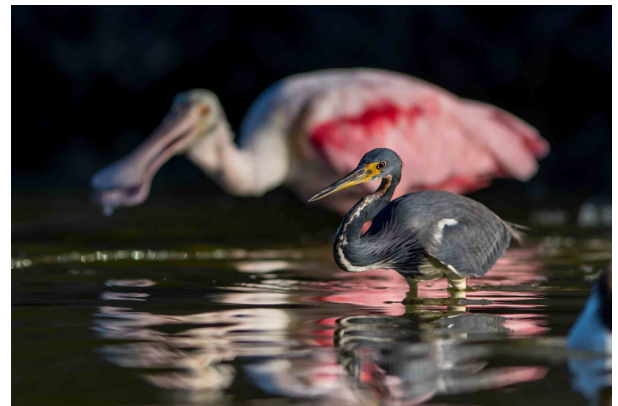
### Biscayne Bay

- ⇒ In 2017 a peak total of 166 wading bird nests were observed in Biscayne Bay, up from 78 recorded in 2016. This increase is accounted for by nesting effort of Great White Heron and White Ibis that was about double the six year average. Great Blue Heron, Great Egret, and Roseate Spoonbill nesting was reflective of the average over the past six years.

Hydropatterns in the Southern Everglades in 2017 that were more representative of traditional levels than in recent years suggests that environmental cues that historically promoted breeding activity occurred this season, leading to improved nesting in Everglades National Park over the previous year. However, the 2017 Spoonbill nesting effort in Florida Bay continues a trend of decline from the early 1990s, with current counts remaining much lower than historical nesting patterns of the 1970s to 1990s when more than 1,000 nests per year were common. These data suggest that conditions within Florida Bay have deteriorated for nesting spoonbills. Spoonbill nesting is one of many environmental indicators suggesting the health of Florida Bay is declining and exhibiting dramatic and rapid changes in its ecology.

## Audubon Recommendations

The 2017 nesting season produced some of the highest nest counts since the banner year of 2009. However, when looking at these results it is important to keep in mind that the Everglades hydrology improvements to-date do not represent what is achievable through a fully restored system. The 2017 results offer a preview into what can be accomplished through full-scale restoration and emphasize the need to accelerate implementation of Everglades restoration projects and programs to give wading birds and the Greater Everglades Ecosystem the increased resilience they need to bounce back and successfully rise above impending challenges like sea level rise, invasive species threats, and fluctuations in rainfall patterns. Audubon recommends the following:



Tri-colored Heron feeding with Roseate Spoonbill in the background. Photo: Jeremy Squire

### Lake Okeechobee and Northern Everglades

- ⇒ Complete backfilling the C-38 ditch by 2020, the last remaining contract of the Kissimmee River Floodplain Restoration project.
- ⇒ Set a Water Reservation Rule for the Kissimmee River to protect water for the natural systems in the Kissimmee Basin.
- ⇒ Return Lake Okeechobee water levels to the desired range of 12.5 to 15.5 feet. Six consecutive years of reaching 16 feet or more has caused a cumulative deterioration of the marsh. A return of regular spring drawdowns to the 12.5 foot range is essential
- ⇒ Complete Herbert Hoover Dike repair only to increase public safety, and avoid returning the Lake to harmfully deep (and dangerous) levels.
- ⇒ Expand the Everglades Headwaters National Wildlife Refuge and other programs that work with private land owners to protect habitat and rehydrate as much as the watershed as possible.
- ⇒ Construct the EAA storage reservoir to provide a new outlet for Lake Okeechobee water during high water conditions.
- ⇒ Finish planning for the Lake Okeechobee Watershed Restoration Project to provide a source of storage north of the Lake that can buffer the Lake during high flows and supply freshwater flows during low water conditions.
- ⇒ Ensure the Basin Management Action Plan significantly reduces phosphorus flowing into Lake Okeechobee.

### Central Everglades

- ⇒ Prioritize construction of the Central Everglades Project to break down barriers to flow in the WCAs by removing more than 25 miles of canals and levees.
- ⇒ Obtain Congressional Authorization and begin construction of the Everglades Agricultural Area Reservoir to increase water management flexibility in the WCAs.
- ⇒ Increase funding for invasive exotic control to maintain critical wading bird habitat, like the Arthur R. Marshall Loxahatchee National Wildlife Refuge in WCA-1.
- ⇒ Fund and construct the Broward County Water Preserve Areas.

## 2017 Wading Bird Nesting in the Everglades:

*Restoring the hydrology-prey-foraging relationship in the Everglades is key to successful wading bird nesting in South Florida*

### Western Everglades

- ⇒ Strengthen protection of existing short-hydroperiod wetlands by revisiting flawed wetland permitting practices.
- ⇒ Continue planning and design of the Western Everglades Restoration Project, and implement those elements already designed and shovel-ready in the Big Cypress Hydrologic Restoration Plan.
- ⇒ Complete remaining portions of the Picayune Strand Restoration Project.
- ⇒ Significantly increase ecological monitoring and modeling throughout the poorly understood Western Everglades watersheds to identify causes and fix unsustainable overdrainage impacts to wetlands and wildlife. Monitoring must include wading birds and their prey.

### Southern Everglades

- ⇒ Complete the 2.6 mile bridge along the Tamiami Trail to increase flows to the Southern Everglades.
- ⇒ Advance modifications to Old Tamiami Trail, which includes 5.45 miles of road removal to further increase hydrologic connectivity and sheetflow to the Southern Everglades.
- ⇒ Maximize operations of the Modified Water Deliveries projects, including the 1-mile and 2.6-mile Tamiami Trail bridges, to increase water flows to Shark River Slough and Taylor Slough.
- ⇒ Complete the construction of the C-111 South Dade project.
- ⇒ Ensure optimal water levels in the C-111 Spreader Canal Western project by raising water levels at S-18C and execute Comprehensive Everglades Restoration Plan state and federal agreements.
- ⇒ Reinitiate planning for the C-111 Spreader Canal Eastern project.
- ⇒ Obtain Congressional Authorization and construction funding for the Everglades Agricultural Area Reservoir in the Water Resources Development Act of 2018

**All regions will benefit from ensuring that sufficient funding is maintained for wetland and wading bird monitoring.**

Thus it is critical to effectively identify causes for nesting declines and to determine whether Everglades restoration projects are achieving their intended benefits.



Snowy Egret chicks. Photo: Jean Hall