

# Reclaimed Water

Working with Nature  
on Hilton Head Island  
BY TODD BALLANTINE



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### About the Author

Todd Ballantine is an environmental scientist, educator, artist and writer for Ballantine Environmental Resources, a national consulting firm in Boulder, Colorado. He developed the first reclaimed water project using advanced-treated water to restore wetlands and watersheds. Todd and Marianne Ballantine currently monitor and report on all the reclaimed water projects for Hilton Head PSD.

## Forward

This report discusses the Hilton Head Public Service District (PSD) reclaimed water projects in Cypress and Whooping Crane conservancies in Hilton Head Plantation, and in wetlands in Palmetto Hall Plantation. Sound scientific data collected over 24 years in the Hilton Head Plantation conservancies, and over the past decade in the Palmetto Hall wetlands, supports the conclusions. Reclaimed water, highly treated and supplied by Hilton Head PSD, has restored Cypress and Whooping Crane conservancies, and it has preserved and restored rare ecosystems in Palmetto Hall. The PSD's reclaimed water program annually recycles nearly 1 billion gallons of wastewater, and in doing so plays a key role in the sustainability of Hilton Head Island's environment and its economy. If you have any questions about this report, please contact Hilton Head PSD at (843) 681-5525 or [info@hhpsd.com](mailto:info@hhpsd.com).

# Saving Nature: Hilton Head PSD Reclaimed Water Projects

## The Greatest Good

Do you wonder where the water goes once you've turned off the tap or stepped out of your shower or flushed? Besides delivering water to you, the Hilton Head Public Service District treats this "wastewater" to strict quality standards set by the U.S. Environmental Protection Agency. But we shouldn't think of this water as waste. It is a valuable resource looking for the right place to go. The Hilton Head PSD wastewater treatment plant produces a valuable end-product called reclaimed water. It goes to restore natural resources and irrigate local golf courses. **Reclaimed water is the longest-running and most beneficial green technology on Hilton Head Island.**

## Not a Drop to Waste

In the early 1900s, many American cities discharged untreated or poorly treated wastewater into rivers, lakes, and oceans. Los Angeles County first applied wastewater on local golf courses. But this water was of low quality and contained pollutants harmful to humans and the environment. Passage of the U.S. Clean Water Act (1972) established standards for eliminating pollution in waters of the U.S. A key quality standard set the goal that surface recreational waters would be "swimmable and fishable." Reclaimed water adheres to the spirit and letter of this goal. First the advanced-treated water meets all standards for toxin and nutrient removal. Second, the water is distributed to four major freshwater wetlands, nourishing the oldest ecosystems on the island. Third, the utility provides reclaimed water as lower cost irrigation on 11 local golf courses. This "aqua-recycling" program benefits uncountable wildlife species, and supports Hilton Head Island's recreation-based economy.



Whooping Crane Conservancy /  
Hilton Head Plantation



Blue-flag Iris



Sawgrass savanna / Palmetto Hall

## Preserving the Ancient Ones

Fifty feet high in the light and shadow of hardwood foliage, a long piercing cry rends the air. Specter-like, a red-shouldered hawk glides between columns of bald cypress and blackgum trees. She alights into her nest. She clutches a frog, or maybe a snake, in her talons: breakfast for her three hungry chicks. This raptor and her mate are likely to return to this nest for 20 years or more. It's the nature of the species; and for her, nature has been preserved with reclaimed water



*Red-shouldered hawk*

Hilton Head PSD supplies reclaimed water to four major wetlands on Hilton Head Island. Each are distinct ecosystems with different geography, hydrology (water conditions), wildlife and a past history of water loss due to development drainage “improvements.”

- **Cypress Conservancy:** Named for its broad-based, lofty bald cypress trees, this wetland is 51 acres of green light and still water in Hilton Head Plantation. A conservation easement protects this last stand of cypress woodland on this island. But it is reclaimed water that provides the water needed to sustain these ancient relatives to redwoods. In over two decades of biological monitoring, we have identified 115 species of wildlife here.
- **Whooping Crane Pond Conservancy:** The deepest water wetland on this island, the 65-acre Whooping Crane Pond project is the most ecologically diverse. This ancient landscape has the most plant communities on Hilton Head.
- **Old-growth Blackgum Forest:** Reclaimed water provides the shallow water needed to sustain this 119-acre community in Palmetto Hall. The dominant blackgum hardwoods provide critical resting and nesting habitat for Neotropical migratory birds – hummingbirds, warblers, vireos, and more – which wing their way from South America to as far north as Canada.
- **Sawgrass Savanna:** Reclaimed water provides enough water to support the last surviving sawgrass community on Hilton Head Island. Waving green or golden aside Palmetto Hall’s Robert Cupp Golf Course, sawgrass is the sharp-edged plant covering much of Florida’s renowned Everglades. From secretive moorhens to colorful dragonflies, aquatic life thrives in the sunny savanna (open marsh).

## Water is Life

Reclaimed water provides enough water to wetlands to overcome losses from groundwater draw-down, caused mostly by construction of lagoons. The water for wetlands and golf courses is enough, but not too much. Each year, evaporation from the water surface and soil, plus transpiration (water vapor from tree leaves and bark) removes over *five feet* of water from water and ground. Reclaimed water simply evens the playing field for places that have been home to wildlife, beautiful silence, and breathtaking beauty for tens of thousands of years.

# Working with Nature in Hilton Head Plantation

## Place of the ANCIENTS

Named for its old-growth bald cypress and blackgum trees, **Cypress Conservancy** is 51 acres of green light and still water.

This freshwater wetland is home to the only large stand of bald-cypress on Hilton Head Island. These majestic trees are southern relatives to redwood and giant sequoia trees. Bald-cypress and blackgum (right) have unique root systems to assure survival in water.

Cypress Conservancy is protected by a permanent conservation easement. But water keeps this wetland alive. Reclaimed water provides shallow freshwater and wet soils that aquatic plants and wildlife need to survive.

Right: rare wetland lichens color the shadowed wetland



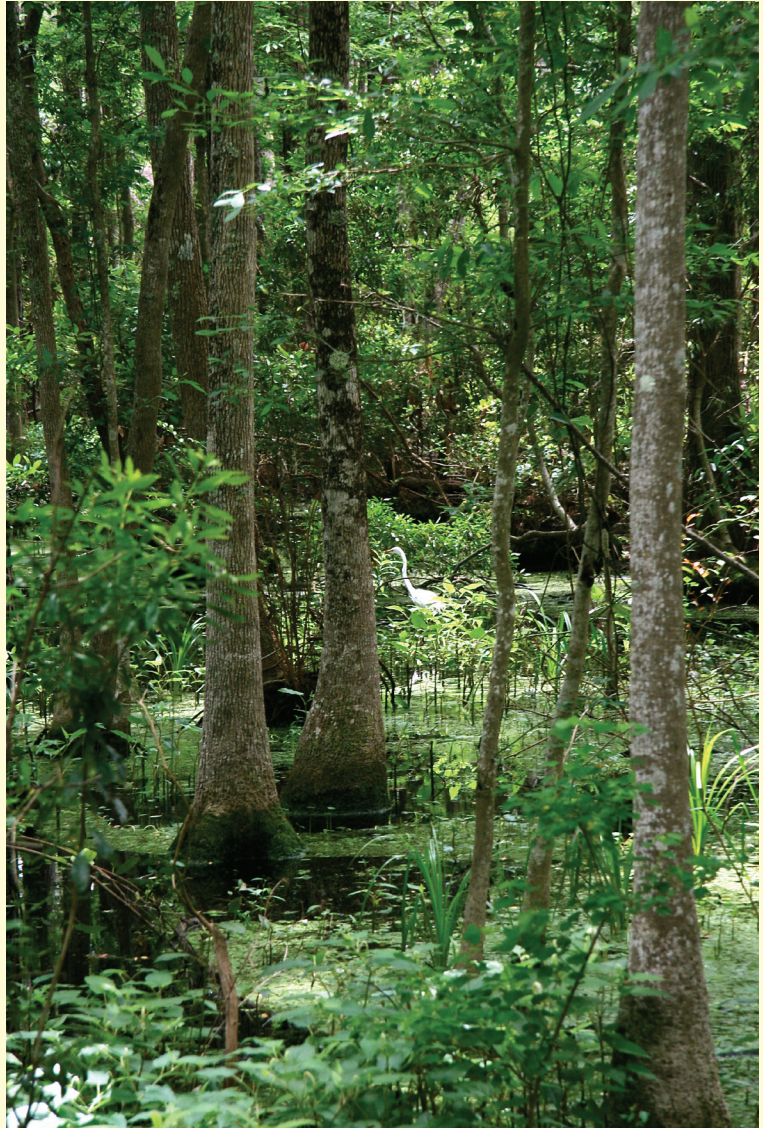
*(Photos: Marianne Ballantine)*

# Whooping Crane Pond Conservancy

## Where the Water is WIDE

**The largest** of wetlands in Hilton Head Plantation, Whooping Crane Conservancy is 115 acres of old growth hardwood forest, marshland, and open water. This vast aquatic system has two cells (sections). The higher northern cell (68 acres) receives reclaimed water – as much as five feet annually in addition to rainfall. The lower southern cell (47 acres) receives only rainfall, an average of 51 inches per year.

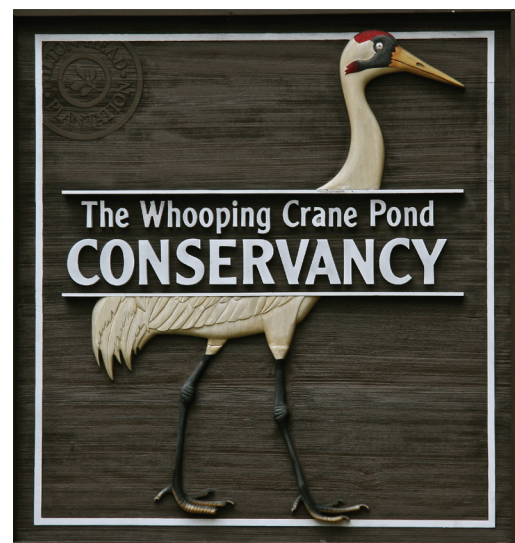
Right: a great egret hunts for fish in a shallow pool.



### What's in a Name?

Whooping Crane Pond Conservancy was named during two periods of island history. In the 1930s, hunters sought waterfowl in the wetland's vast interior marshes. To provide open water, they dynamited an open pond for wintering ducks. This remnant pond is now a marsh with areas of water nearly five feet deep. During those early years, hunters probably observed wood storks flying overhead and mistook them for **whooping cranes**, native to the Midwest and Gulf states. The term **conservancy** refers to the conservation agreement preserving this unique ecosystem for perpetuity.

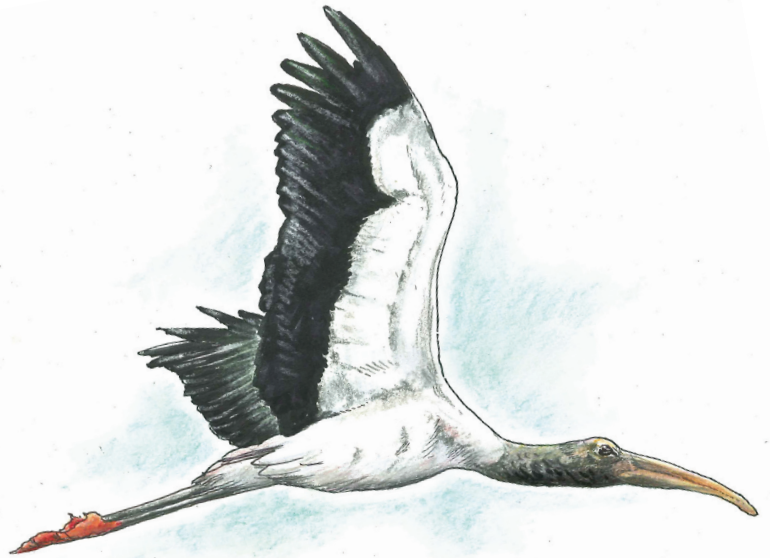
*(Photos: Marianne Ballantine)*



# Wildlife Profile

## Saved from Extinction

Reclaimed water in wetlands has helped the survival of the endangered **wood stork** (*Mycteria americana*). Seen soaring over Whooping Crane Conservancy, this large bird also wades in the shallow water, keeping its long “decurved” bill under the surface. On contact, the sensitive beak snaps shut to capture small fish, frogs, and reptiles – including baby alligators.



Once common on the lower southeastern coast, wood storks declined in the 1900s from loss of wetland habitats and hunting. Now protected by the U.S. Endangered Species Act, this ancient species is making a comeback. Reclaimed water has restored ponds and marsh pools that the wood stork requires.

## Wetland Pools in Whooping Crane Conservancy

Prime feeding grounds for wood storks and other wading birds.



(Illustration: Todd Ballantine) (Photo: Marianne Balantine)



Todd Ballantine measures tree growth in the reclaimed water wetlands. Blackgum trees are “old growth” (long-living) hardwoods. Reclaimed water has stabilized habitat for this species by offsetting the impact of drought and water diversion.

# Monitoring the Wetlands

## How are the Wetlands Doing?

Ballantine Environmental Resources developed the concept for restoring aquatic ecosystems with reclaimed water. To comply with conditions in Hilton Head PSD’s discharge permit, as required by the Clean Water Act, the Ballantine monitoring study measures hydrology (water conditions), vegetation growth, and the wildlife population – from alligators to near microscopic invertebrates.

“Cypress and Whooping Crane Conservancy have acclimated to the regular flow of reclaimed water, primarily from late autumn through early spring, the natural cycle of rain. Trees, shrubs, and groundcover filter the water and create diverse wildlife habitat,” Ballantine reports.



Camouflaged in a sea of green, the yellow-crowned night heron rests while hunting small fish.

*(Photos: Marianne Ballantine)*

# Did You Know?

## Frequently Asked Questions About Reclaimed Water in Hilton Head Plantation

**When did reclaimed water operations begin in Hilton Head Plantation?** Planning for reclaimed water operations began in 1985. The first water was provided to Whooping Crane Pond in 1986.

**Why is reclaimed water valuable?** Reclaimed water is an original “green” technology. By distributing water into natural wetlands, Hilton Head PSD: (1) keeps wastewater out of fishable, swimmable waters in the Atlantic Ocean and Port Royal Sound; (2) restores water conditions in the wetlands that were drained by development in the plantation; (3) preserves rare ecosystems and wildlife habitat; (4) improves surface water quality in the plantation (wetland plants filter and absorb nutrients) and (5) provides high quality irrigation to local golf courses at lower cost than potable (drinking) water.

**Where else is reclaimed water used on Hilton Head Island?** Hilton Head PSD operates two more projects in Palmetto Hall wetlands. South Island PSD operates two projects in Sea Pines.

**How many species of plants and animals live in the wetlands?** Ballantine Environmental Resources has identified 69 plant species and 115 wildlife species since operations began in the Cypress Conservancy. In Whooping Crane Pond, Ballantine identified 75 plant species and 98 wildlife species. And the lists are growing.

**Where can I see the reclaimed water wetlands and the wildlife?** Hilton Head Plantation residents and their guests can visit Cypress Conservancy from the boardwalk behind the Cypress facility. Whooping Crane Pond is accessible from the scenic boardwalk and trail access from Whooping Crane Way. *Enjoy your visit!*

The green treefrog is a common resident in the reclaimed water wetlands. But worldwide, amphibians are in decline due to loss of habitat.

*(Photo: Marianne Ballantine)*





In the early 1900s, Hilton Head Island was an isolated rural island with about 300 residents. Here, and in nearby cities such as Beaufort, SC, and Savannah, GA, partially treated wastewater was discharged into farm fields, creeks and rivers. These areas became polluted with microbes and toxins harmful to humans and wildlife. Today, reclaimed water sustains wetlands as seen above.

*(Photos: Marianne Ballantine)*

## Palmetto Hall Water Project

First applied on Hilton Head Island in 1981, and in Palmetto Hall in 1996, reclaimed water is advanced-treated domestic wastewater. Additional organics, nutrients, and toxins are removed. Also, this water is not “wasted,” it is pumped to restore freshwater wetlands and irrigate local golf courses.



Irrigating golf courses with reclaimed water is cost-effective and supports Hilton Head Island’s recreation-based economy.

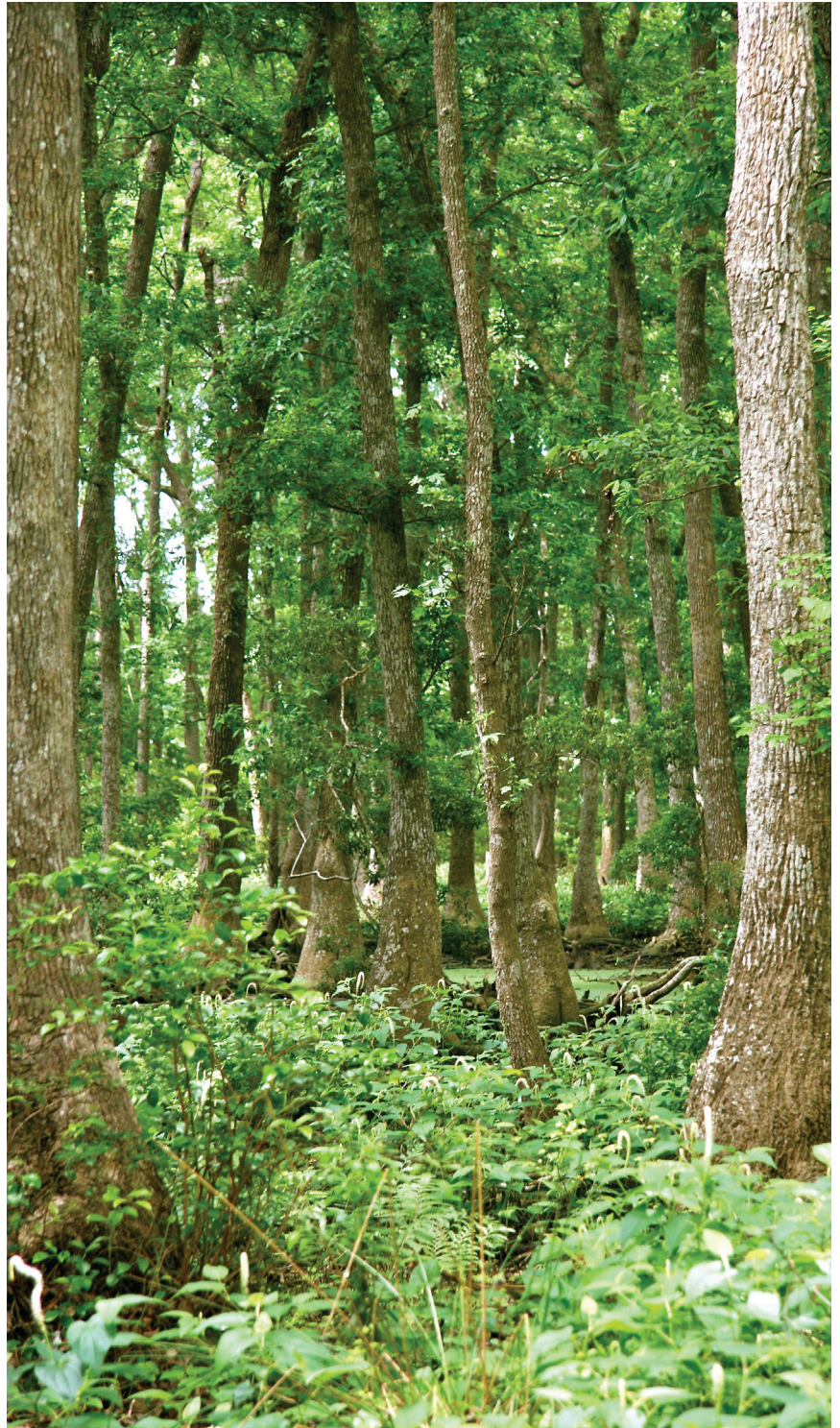
*(Photo: Hilton Head PSD)*

# Preserving Ancient Places

**In Palmetto Hall, the wetlands** run like parallel shallow valleys, draining from southwest to northeast. Eventually, these wetlands drain into Port Royal Sound. These low lands are former shorelines, formed tens of thousands of years ago, during periods of higher sea level. The wetlands are naturally fed by rainfall and groundwater infiltration. But over the past 50 years, land development and drainage projects have altered natural drainage patterns. Many island wetlands have become drier and smaller.

## Reclaimed Water has Saved Wetlands in Palmetto Hall

- Flow of high quality water maintains the natural depth and coverage of water in wetlands.
- Reclaimed water stimulates the growth of diverse aquatic vegetation.
- Regular input of reclaimed water maintains a diverse, balanced population of wildlife from large species to the smallest invertebrates.
- Reclaimed water inflow benefits wetlands during periods of drought, which have become more common in recent years.



Old growth blackgum trees guard the virgin hardwood forest in the center of Palmetto Hall. The Forested Wetland is one of two large wetlands receiving reclaimed water in the community.  
*(Photo: Marianne Ballantine)*

# The Last Savanna



## Narrow and Secluded

A **one-of-a-kind** wetland shoulders the Robert Cupp Golf Course in western Palmetto Hall. From a golfer's perspective, this is a "hazard" that punishes the slice and is the final resting place for a prized Titleist. Few players venture into this marsh to salvage a ball. This is the world of head-high, sharp-leaved grass.

**Sawgrass** pervades this wetland. This is the renowned "River of Grass" species in the Florida Everglades. This grass thrives in open wet marshes called savannas. Reclaimed water provides the surface water **sawgrass** needs to survive in Palmetto Hall. Thanks to regular flow, this vast savanna remains the vital, last surviving sawgrass community on Hilton Head Island.

**Resident** animals in sawgrass include: moorhen, purple gallinule, great and snowy egret, white ibis, eastern bluebird, warblers, red-shouldered hawk, marsh rabbit, white-tailed deer, and a healthy team of frogs, reptiles, dragonflies, butterflies and aquatic invertebrates.



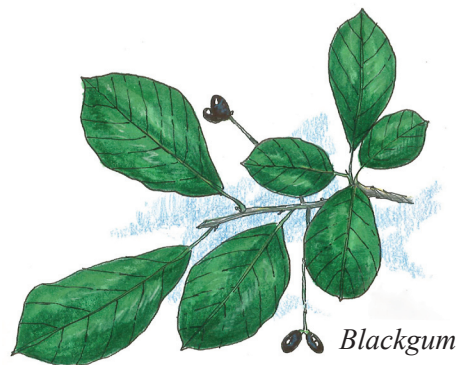
*(Photos: Marianne Ballantine)*

# Forested Wetland



Aligned like dinosaur legs in a primordial landscape, swollen trunks anchor blackgum trees in the wet soil. Here, shallow pools are refuge for small fish, amphibians, wading birds, secretive reptiles, and a large population of invertebrates – the foundation of the wetland food web. Many aquatic animals find refuge on and under the tangle of exposed roots. The water is clear and tea-colored from acids dissolved from fallen leaves.

*(Photo and illustrations: Todd Ballantine)*



*The red-shouldered hawk nests in the Forested Wetland*

## Sentries in Time

The majestic Forested Wetland is 199 acres of old growth hardwood trees, seasonal pools, fragrant flowers, and secretive wildlife – all living a few yards away from Palmetto Hall’s Arthur Hills Golf Course. Surface water flows ever-so-slowly in this forest. Water follows an eastward path to Port Royal Sound. But most of the water never leaves this wetland. Each year, more than 50 inches of water are removed by evaporation and as vapor from tree leaves.

# Inside Reclaimed Water

**Palmetto Hall opened its wetlands** to a new water source barely a decade ago. Reclaimed water, processed and treated by Hilton Head Public Service District, now flows through the Golf Course and Forested Wetlands, nourishing the watershed and preserving these ancient ecosystems.

## Water Is Life

- In an average year, about 36 inches of reclaimed water are pumped into the wetlands.
- Reclaimed water does not overflow or damage the wetlands. It is far less than normal rainfall, and it is needed to sustain water levels in the wetlands. Read on...
- Water in the wetlands is lost to drought (more common in the past decade), groundwater flow to lagoons, and over 50 inches per year from evapotranspiration by trees.
- The wetlands receive less reclaimed water in spring and summer. That's when it's needed for irrigation on golf courses.
- Surface water is life support for wetland wildlife. It provides habitat for insects, spiders, amphipods, amphibians and fish. These are a vital food source for larger animals such as wading and migratory birds.
- The continuous tree cover in the Forested Wetland is a critical nesting and resting area for migratory birds. Species such as hummingbirds, warblers, vireos, buntings, sparrows and more visit this mature hardwood bottomland in spring and summer.



Scientific monitoring and testing assures that water quality remains high and that the ecology of the wetlands is free of impacts. Ballantine Environmental Resources provides biological monitoring and regular reports to assure the wetlands are preserved and able to assimilate reclaimed water. Hilton Head PSD monitors water quality and many other parameters. The project adheres to stringent U.S. Environmental Protection Agency Permit requirements. Shown here: Todd Ballantine measures wetland trees to determine their growth rate.

*(Photo: Marianne Ballantine)*

# Did You Know?

## Frequently Asked Questions About Reclaimed Water in Palmetto Hall

**When did reclaimed water operations begin in Palmetto Hall?** Hilton Head PSD first discharged reclaimed water into the wetlands in 1996. Environmental monitoring has been ongoing since 1999.

**Why is reclaimed water valuable?** Reclaimed water is an original “green” technology. By distributing water into natural wetlands, Hilton Head PSD: (1) keeps wastewater out of fishable, swimmable waters in the Atlantic Ocean and Port Royal Sound; (2) restores water conditions in the wetlands that were drained by development in Palmetto Hall; (3) preserves rare ecosystems and wildlife habitat; (4) improves surface water quality in Palmetto Hall (wetland plants filter and absorb nutrients) and (5) provides high quality irrigation to local golf courses at lower cost than potable (drinking) water.

**How many animal species inhabit the Palmetto Hall wetlands?** Since monitoring began, we have identified 73 wildlife species in the Forested Wetland and 67 species in the Golf Course Wetland. However, the number of species is higher because many migratory birds, insects, and other animals occupy the wetlands at different times of the year.

**How many plant species are found in the Palmetto Hall wetlands?** Since monitoring began, we have identified 20 plant species in the Forested Wetlands, and in the Golf Course Wetland, 23 species.

**Do any endangered species live in the wetlands?** During monitoring, we have identified the endangered wood stork and the formerly threatened bald eagle. The wood stork is likely to feed on fish and crayfish in shallow pools of the Forested and Golf Course Wetlands.

**Where else is reclaimed water used on Hilton Head Island?** Hilton Head PSD operates two more projects in Hilton Head Plantation wetlands. South Island PSD operates two projects in Sea Pines. The Palmetto Hall project is the largest.

