

Florida

LAKEWATCH



Dedicated to Sharing Information About Water Management and the Florida LAKEWATCH Program Volume 43 (2008)

Florida LAKEWATCH Aquatic Bird Survey



Little Blue Heron. ©Dan Sudia

Dan Sudia

The Little Blue Heron is a common visitor to Florida waterbodies.

Because Florida's wetlands are continuing to be altered or destroyed, the utilization of aquatic habitat by bird communities needs to be documented. Since Florida LAKEWATCH volunteers expressed a desire to survey the birds using Florida's water bodies, we provided them a way to do just that! Thanks to their monitoring efforts, we now have a large data base that will help in determining which bird species are associated with Florida water bodies and in developing future management strategies. These data, combined with water chemistry and aquatic plant data, also give Florida LAKEWATCH staff and other professionals a way to examine the ecology of aquatic birds that utilize these systems.

The objective of the Florida LAKEWATCH Aquatic Bird Survey was to establish a standardized, long-term citizen-monitoring program to examine seasonal and yearly trends in bird populations using Florida's aquatic habitats. These statewide bird surveys provide volunteers with a means to document bird populations using the areas near water bodies and to monitor usage trends over time. Through their efforts, a considerable number of bird species have been directly observed and quantified. These data are now being used to examine long-term trends in bird diversity and abundance

For our purposes, "aquatic birds" were defined as "all bird species that utilize any

type of aquatic or shoreline habitat." This program was designed to monitor long-term and seasonal trends in bird abundance, so we asked the volunteers to do at least one bird survey per month. Before beginning the actual bird counts, volunteers were encouraged to learn the bird species that frequent their area by using a field identification guide. We advised volunteers to create a list of common bird species for their area and then practice estimating the numbers

Continued on page 2.



observed for the various species. When possible, we talked with the volunteers to evaluate their birding skills, establish the specifics of the survey protocol for their lake, and answer any questions they might have.

A protocol was developed so that bird surveys would be done in similar manner to allow for meaningful comparisons. We asked that bird counts be conducted by slowly boating once around the edge of the lake while counting all birds observed using aquatic habitats. Although we preferred bird surveys to be done from a boat, surveys that were performed by walking the shoreline or from a fixed point on the volunteer's property were accepted. Volunteers were instructed to record whether their surveys were done by boat, by walking around the water body's shoreline, or by observing from a fixed location such as a dock or yard.

Florida LAKEWATCH volunteers began counting birds using aquatic habitats in



Steven Pinker

The Great Blue Heron was the most commonly sighted bird on Florida lakes from 2000 to 2008 in the Florida LAKEWATCH aquatic bird survey.

Table 1. List of the 50 most commonly observed birds using aquatic habitats as surveyed by Florida LAKEWATCH volunteers between 2000-2008. Observed represents the number of surveys during which the species was observed and includes all 115 water bodies. Bird species marked with an asterisk (*) are considered by Florida LAKEWATCH to be strictly aquatic species.

Bird Species	Observed	Bird Species	Observed
Great Blue Heron *	1011	Pied-billed Grebe *	227
Anhinga *	983	Common Grackle	215
Great Egret *	917	Wood Stork *	182
Osprey *	738	Blue Jay	180
Little Blue Heron *	703	Terns *	178
Crows	657	Muscovy Duck *	173
Common Moorhen *	627	Northern Cardinal	167
White Ibis *	586	Limpkin *	157
Boat-tailed Grackle *	568	Northern Mockingbird	149
Double-crested Cormorant *	560	Purple Martin *	127
Red-winged Blackbird *	549	Swallows *	125
Belted Kingfisher *	542	Purple Gallinule *	110
Mallard *	509	Mourning Dove	97
Turkey Vulture	464	Red-tailed Hawk	94
Gulls *	424	Domestic Duck *	91
Red-shouldered Hawk	421	Killdeer *	89
Snowy Egret *	396	Ducks *	86
Wood Duck *	394	Glossy Ibis *	85
American Coot *	371	Brown Pelican *	85
Green-backed Heron *	334	Domestic Goose *	83
Black Vulture	321	Mottled Duck *	73
Tricolored Heron *	318	Black-crowned Night-Heron *	71
Sandhill Crane *	286	Doves	68
Bald Eagle *	256	Rock Dove	67
Cattle Egret	251	Mixed Vultures	64

2000. Since that time they have conducted bird counts on 115 aquatic systems that include lakes, rivers, and coastal bays.

Lakes dominated the aquatic systems with a total of 107 lakes, 5 rivers, and 3 bays being surveyed between 2000 and 2008. Surveys were returned from 23 counties located throughout the state from the western panhandle to south Florida. The counties with the most survey observations were Hillsborough, Orange, Lake, Polk, and Highlands. This is not surprising since these counties have lots of lakes and many active volunteers.

More than 150 bird species were identified during the bird surveys, with some species being observed

many times on the 115 water bodies that were surveyed (Table 1) and other species being spotted on only a few occasions (Table 2). Based on the number of surveys each species was reported on, the Great Blue Heron was the most commonly observed species followed by the Anhinga, Great Egret, Osprey, and Little Blue Heron. Other birds, while not usually considered to be strictly aquatic species yet were commonly observed, included crows, vultures, hawks, swallows, and doves (Table 1). Many of the less commonly observed birds listed in Table 2 are not generally considered to be strictly aquatic species, as would be expected. They include various songbirds such as vireos, finches, thrushes, wrens, and warblers.

However, quite a few species that are considered to be strictly aquatic species are also found in Table 2 and were not observed frequently. For example, the Snowy Plover, Wilson's Plover, Gadwall, Bufflehead, Snail Kite, and Greater Yellowlegs are considered to be strictly aquatic species, yet were rarely reported. The species listed in Tables 1 and 2 and marked with an asterisk (*) are species that Florida LAKEWATCH

considers to be strictly aquatic species.

We thank everyone who has participated in the bird surveys and hope they will continue to monitor the bird populations on their aquatic systems. We also encourage anyone who is interested to begin doing bird surveys on the aquatic system of their choice.

for beginning an aquatic bird survey; just contact your regional coordinator or Eric Schulz at 1-800-525-3928. For those individuals interested in starting an aquatic bird survey, but unable to identify aquatic birds, we recommend acquiring a good field guide to birds such as the *Peterson Field Guide to Eastern Birds* or *A Guide to Field Identification Birds of North America*. Learning to identify the most common birds listed in Table 1 will be very helpful and will make your new hobby more interesting. Then you can have fun while helping to monitor the birds using your aquatic system.

Table 2. List of the 50 least frequently observed birds using aquatic habitats as surveyed by Florida LAKEWATCH volunteers between 2000-2008. Observed represents the number of surveys during which the species was observed and includes all 115 water bodies. Bird species marked with an asterisk (*) are considered by Florida LAKEWATCH to be strictly aquatic species.

Bird Species	Observed	Bird Species	Observed
White-eyed Vireo	2	Prairie Warbler	1
Summer Tanager	2	Orioles	1
Snowy Plover *	2	Northern Waterthrush *	1
Sanderling *	2	Northern Oriole	1
Purple Finch	2	Nightingales	1
Nighthawk	2	Mississippi Kite *	1
Gadwall *	2	Merlin	1
Eurasian collared-dove	2	Marsh Wren *	1
Domestic Parrot	2	Lesser Yellowlegs *	1
Brown-headed Nuthatch	2	Least Tern *	1
Brown-headed Cowbird	2	Indigo Bunting	1
Wood Thrush	1	House Wren	1
Wilson's Plover *	1	Hooded Warbler	1
Wilson's Phalarope *	1	Greater Yellowlegs *	1
Whistling Ducks *	1	Florida Scrub Jay	1
Water Pipit *	1	Eastern Wood-Pewee	1
Thrushes	1	Eastern Towhee	1
Song Sparrow	1	Domestic Guinea Hen	1
Snail Kite *	1	Domestic Cockatiel	1
Short-billed Dowitcher *	1	Bufflehead *	1
Semipalmated Plover *	1	Brewer's Blackbird	1
Sandwich Tern *	1	Bobolink	1
Rusty Blackbird	1	Black Tern *	1
Ruddy Turnstone *	1	Barn Swallow *	1
Rails *	1	Bank Swallow *	1



An adult male snail kite photographed in the everglades has dinner in talon.

Federation of American Scientists

Florida LAKEWATCH has a protocol for beginning an aquatic bird survey; just contact your regional coordinator or Eric Schulz at 1-800-525-3928 for more information. For those individuals interested in starting an aquatic bird survey, but unable to identify aquatic birds, we recommend acquiring a good field guide to birds such as the *Peterson Field Guide to Eastern Birds* or *A Guide to Field Identification Birds of North America*.

The Cradle of the Ocean: Estuaries



waterencyclopedia.com

An estuary in Florida.

What are estuaries?

Estuaries are semi-enclosed areas, such as bays and lagoons, where fresh water meets and mixes with salty ocean waters. Estuaries are dynamic systems with constantly changing tides and temperatures where salinity (concentration of salt in the water) varies temporally and spatially.

Survival of plants and animals in estuaries requires special adaptations. The ebb and flow of tides may leave some plants and animals, such as marsh grasses and oysters, temporarily high and dry. Temperatures in shallow estuarine waters can range from freezing to more than 100° F during the course of a year and expose marine organisms to intense sunlight and drying.

Estuarine organisms are naturally adapted to withstand these ranges in salinity, tides, sunlight, and temperatures. They must, however, have a balanced flow of fresh and salt water. This balance can be upset if too much fresh water enters the

estuary, which can happen when causeways are constructed, impeding the free flow of tides: or if too little fresh water is available, as occurs during drought and when a river is diverted or dammed. Estuarine-dependant marine life may die if the balance of fresh and salt water is not maintained.

Why are estuaries special?

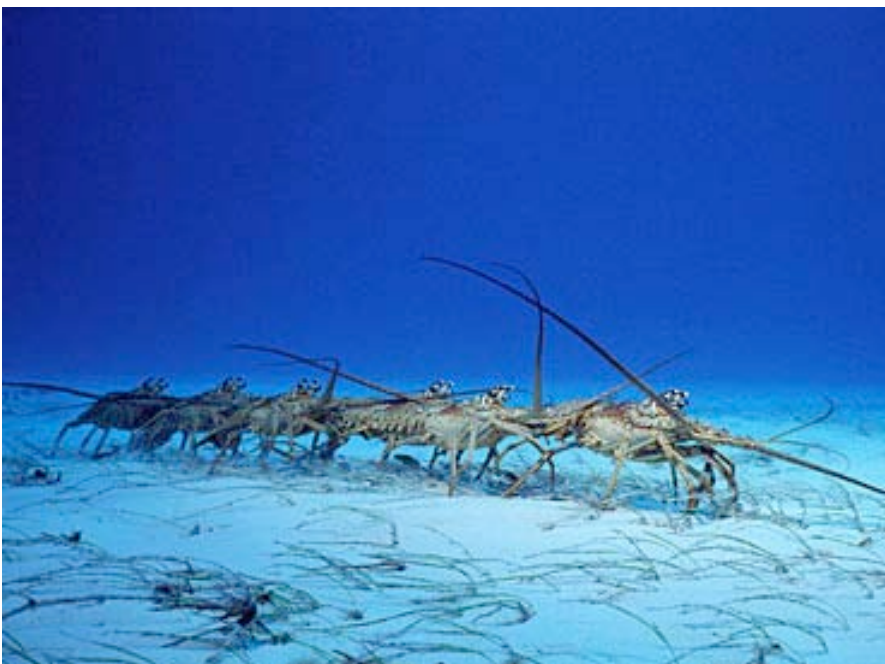
“The cradle of the ocean” is an appropriate description of estuaries. More than 95% of Florida’s recreationally and commercially important fishes, crustaceans, and shellfish spend periods of their lives in estuaries, usually when they are young. Many fish and crustaceans migrate offshore to spawn or breed. The eggs develop into larvae (immature forms) that are transported into estuaries by tides and currents. The shallow waters, salt marshes, seagrasses, and mangroves provide excellent places to hide from larger predators. Some species grow in estuaries for a short time, but others may remain there all their lives.

Estuaries are among the most productive landscapes in nature. Rivers and streams drain into estuaries, bringing nutrients from uplands. Plants use these nutrients along with the sun’s energy, carbon dioxide, and water to manufacture food. Among the important plant forms that contribute to estuaries are microscopic floating plants called phytoplankton and larger macroalgae that are attached to the bottom. Rooted plants include marsh grasses, mangroves, and seagrasses. When these larger plants die, they are colonized by microbes (bacteria, fungi, and other organisms) that break them down into detritus. During decomposition, detritus becomes smaller and smaller until the nutrients and particles can become food for billions of small animals. Larger animals feed directly on these tiny particles and on smaller animals that fed on the detritus, and energy is transferred through the food web to progressively larger organisms. As long as nutrient rich, pollutant free, fresh water continues to mix with marine waters in our estuaries, they will remain productive fisheries.

Without estuaries, many important fisheries would disappear. Snook, trout, mullet, grouper, redfish, sheepshead, spiny lobster, shrimp, crabs, oysters and clams are examples of the diverse marine animals dependent upon healthy estuaries. Estuaries also provide roosting and nesting areas, or rookeries for many birds, including several endangered and protected species, such as brown pelicans.

Florida's estuaries

Loss of estuarine habitat is a serious problem along Florida's coasts. Florida is undergoing tremendous growth and 78% of Florida's estimated 14 million residents live in coastal areas. Coastal development is damaging marine-fisheries habitats that are important in maintaining viable commercial and recreational fisheries. Dredge-and-fill operations for waterfront homes and seawall construction destroy mangrove shoreline and underwater seagrasses. Although these activities may temporarily enhance real estate values, they ultimately decrease long-term value as natural amenities disappear, the water becomes foul, and wildlife departs.



Doug Perrine

The spiny lobster is one of many species that would disappear without estuaries.



SeretsofSanibel.com

An aerial view of Sanibel Island on the south-west coast of Florida.

Scientists at the Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute (FWRI) use information from LANDSAT and other satellites to map and monitor Florida's coast. By looking at aerial photographs from different years, scientist can locate and measure the acreage of existing estuarine habitat components such as salt marshes, mangroves, and seagrasses and can observe trends in habitat change. Results of habitat trend analyses have shown substantial loss of fisheries habitats throughout Florida. One study area on the Atlantic coast included the Indian River from Sebastian Inlet south to

the St. Lucie Inlet. In that area the mangrove habitat available to fisheries declined 86% over a 40-year period, and 30% of the seagrass acreage was lost. Over a 100-year period, Tampa Bay, in southwest Florida lost 81% of its seagrasses and 40% of its mangrove and salt marsh acreage.

How can you help protect them?

Use common sense when you are on a boat, at the beach, at home, or anywhere else. Properly dispose of all trash and debris in garbage cans. (see water goat article on page 11). Always dispose of used automobile oil at recycling centers. Follow the labels on fertilizers and pesticides and use the proper amount when treating your yard. These simple steps can help protect Florida's "cradle of the ocean."

The information used to compile this article was derived from a brochure developed from the Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute.

You can visit them at:

<http://research.MYFWC.com>

Volunteer Bulletin Board

MECHANICAL HARVESTER

LAKEWATCH now owns an Aquarius EH-220 aquatic plant harvester that volunteers may use depending on availability.

LAKEWATCH is making this harvester available to its valued volunteers. The harvester is used to control problem aquatic plants and it works best in shallow areas of the waterbody. If aquatic plants interfere with a particular lake use then it is generally considered a problem. If you have identified an aquatic plant problem in your lake that you think a harvester could help, ours is now available to you for a donation to Florida LAKEWATCH. The recommended donation for the use of the machine is \$50 per hour without an operator and \$100 per hour with an operator. There is also a delivery cost of \$0.55 per mile.

The harvester is approximately 31 feet long and 12 feet wide. The EH-220 harvester has a five-foot wide cutting swath, can cut to approximately seven feet deep and is ideally suited for smaller water bodies. The harvester's hydraulic system that controls the craft contains a fluid that is a biodegradable making it safe for lakes. The harvester offers an environmental friendly method of controlling unwanted aquatic vegetation. It acts like an underwater lawn mower cutting the vegetation and storing it on the deck. Once the holding capacity of the harvester is met, then the harvester returns to shore to unload harvested plant material.

Individuals interested in using the harvester will be responsible for obtaining all required permits. To reserve the harvester for your use, contact Daniel E. Canfield, Jr. at 352-392-9617 ext. 246 or decan@ufl.edu.



Dan Willis

New LAKEWATCH Collection Centers in Polk County

Bartow

UF/IFAS Extension Office
Contact: John Brenneman
Phone: 863-519-8677
Address: 1702 Hwy 17/98 S
(PO Box 9005 Drawer HS03),
Bartow, Florida 33859

Lakeland

Lakeland Public Works Department
Contacts: Lakes Manager - Doug Gleckler
Lake's Program Coordinator – Cindy Hill
Phone: 863-834-8429
Address: 407 Fairway Ave.,
Lakeland, Florida 33801

Announcement:

Merger of Fisheries and Aquatic Sciences and the School of Forest Resources & Conservation

Florida LAKEWATCH Volunteers and Stakeholders:

The Department of Fisheries and Aquatic Sciences has merged with the School of Forest Resources and Conservation (SFRC) and will now be one of three broad programmatic areas within the SFRC along with Geomatics and Forest Resources and Conservation. The faculty and staff of the Program for Fisheries and Aquatic Sciences (PFAS) will continue to deliver the premier teaching, research and extension programs that have earned them national acclaim.

The Florida LAKEWATCH program will also continue as it has in the past. Volunteers who are familiar with working through the Department of Fisheries and Aquatic Sciences telephone systems and occasional letterhead should not be alarmed at the new titles that will be used. Tim White is the overall Director of the SFRC, while George Blakeslee and Tom Frazer are the Associate Directors.



LAKEWATCH NEEDS YOU!



These lakes have been inactive for over one year. If you know of anyone who might want to sample any of these lakes please have them call us at 1-800-525-3928 or e-mail us at fl-lakewatch@ufl.edu

Osceola County

Ajay	Jackson
Boggy Cove	Kissimmee
Brick	Live Oak
Buck	Marion
Cat	Runnymede
	Tohopekliga
Cypress	West Middle
	Tohopekliga
Fells Cove	West North
	Tohopekliga
Gentry	West South

Orange County

Adair	Chase
Angelina	Christie
Apopka	Claire
Arnold	Clear
Avalon	Como
Baldwin	Conway North
Bay	Conway South
Bell	Copeland
Big Sand	Crystal
Big Sand Bay	Cypress
Blanche	Daniel
C	Davis
Cane	Dot
Cay Dee	Dream
Charity North	Druid

Orange County

Estelle	Lawne
Estelle East	Lawsona
Eulalia	Little Conway
Eve	Little Down
Fairview	Little Pheasant
Fischer	Little Wauseon Bay
Floy	Lorna Doone
Gatlin	Louise
Gear	Love
Gem	Lucerne East
George	Lucerne West
Greenwood	Lucien
Hiawassee	Maitland
Highland	Mann
Hope	Margaret
Horseshoe	Marshall
Hubbert	Martha
Irma	Mary Jess
Isleworth	Metro West
Ivanhoe East	Mira
Ivanhoe Middle	Nan
Ivanhoe Northwest	Olive
Ivanhoe West	Orlando
Jessamine	Park
Killarney	Pearl
La Grange	Pineloch
Lancaster	Pocket

Orange County

Price	Tennessee
Rabama	Terrace
Richmond	Theresa
	Timber River
Rock	Pond
Rose	Underhill
Rouse	Wade
Rowena	Walker
San Susan	Waunatta
Santiago	Wauseon Bay
Sawyer	West
Sheen	Whippoorwill
Silver	William Davis
Smith	Willisaria
Spring	Winyah
Sue	Wise
Sybelia	

Alachua County

Bonnet	Johnson Pond
	Magnesia
Calf Pond	Springs
Clear	Meta
Dean Pond	Mize
Gwynn Oaks	Moon
Holly Forest	Moss
	Watermelon
Bonnet	Pond

Recycling is Not Just for Aluminum and Plastic!

“Water, water, everywhere and not a drop to drink...” A telling line from a famous poem should give all Floridians an appreciation for the importance and responsibility of good water stewardship. Florida’s initial impetus for reuse stems from efforts in the early 1970’s aimed at eliminating environmental degradation caused by sewage effluent disposal. In 1989, the Legislature established a state objective to encourage and promote conservation and the reuse of reclaimed water. Where are we today?

The water consumers mantra should be: “Conserve, Recycle, and Reuse.” Conservation of water is by far the first and easiest way to reduce groundwater withdrawals. It also reduces the amount of discharges and the associated energy and chemicals needed to prepare the water for reintroduction into the environment. One of the simplest examples of conserving water in the home is capturing rainwater for use in watering shrubbery and ornamental plants. The rain barrel is once again being recommended by today’s conservationists and is referred to as water harvesting.

The term “recycle” as applied here is defined as reusing the same water multiple times. Recycling of irrigation water through tail water recovery, field border irrigation pits, and rainfall harvesting are already being implemented in agricultural and nursery operations. Basically, growing areas are designed with water catchment systems to facilitate the reapplication of runoff water to the growing area. Industries, commercial businesses, and institutions also use closed loop cooling systems and cooling towers in their air conditioning systems, effectively allowing the water to be used again and again.

Reuse is the deliberate application of reclaimed water (secondarily treated



River Falls Wisconsin Engineering Department

One of the simplest examples of conserving water in the home is capturing rainwater for use in watering shrubbery and ornamental plants.

sewage effluent) for a beneficial purpose (e.g., irrigation, car washes, and flushing toilets) but not for potable uses. Reclaimed water lines are being planned and installed in new housing developments throughout Florida. Wastewater is collected, treated, and redistributed through reclaimed water distribution systems. One potential problem associated with using secondarily treated sewage effluent for irrigation in residential areas is the concern that these nutrient-rich waters may actually increase the eutrophication of nearby water bodies.

Some Counties have already taken the initiative

A utility in Walton County installed a reclaimed water redistribution system for irrigating a new residential development in an effort to reduce the withdrawal of fresh water from the local coastal aquifer wells. Wells along the coastal areas are subject to saltwater intrusion if excessive withdrawals occur, so minimizing or diverting water use from coastal wells reduces this threat. Seminole County is one of several counties where residential reclaimed retrofit programs are being planned that will construct reclaimed water pipes to residents in various communities.

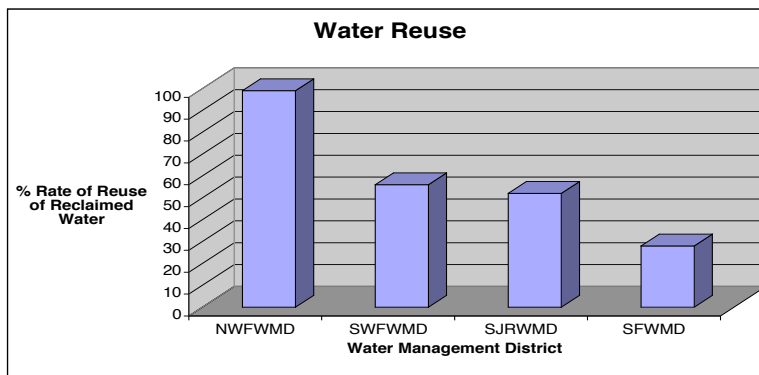
In Manatee County there is a federally funded grant program for connecting agricultural users to the

County's reclaimed water lines. Currently, a minimal amount of reclaimed water is used for agricultural irrigation due to restrictions in using reclaimed water on edible crops due to potential health issues. Additionally, reclaimed water used in containerized growing operations can lead to salt build up in nursery stock and can injure susceptible plants. Other agricultural operations would likely benefit from reclaimed water use.

Since reuse has generally been viewed as a means of disposing of wastewater effluent without harming the environment, regulatory agencies have not been concerned with how efficiently reclaimed water is used. The water management districts are beginning to encourage efficient reuse that offsets water demand or recharges ground water supplies. It has been estimated that reuse of reclaimed water has reduced wastewater discharges by 36% statewide according to a report based on the Florida Department of Environmental Protection's 1999 Reuse Inventory.

Water Management Districts provide general guidance

Florida's Five Water Management Districts (WMD) influence water user decisions about implementing reuse by using financial incentives and through their policies. Some WMD will not approve permits to use traditional water sources when they believe that it is feasible to use reclaimed water, whereas other districts are more relaxed concerning reuse as long as existing discharges do not violate existing resource protection standards. In fact, WMD policies vary widely and result in different outcomes because state law does not clearly define the



The five Florida Water Management Districts policies vary widely on the reuse of reclaim water resulting in different rates of reuse. No information was available for the Suwannee River WMD.

circumstances under which it is feasible to use reclaimed water.

The Northwest Florida WMD does not permit the use of groundwater for certain types of irrigation in its coastal Water Resource Caution Area due to the potential for saltwater intrusion. As a result, this district has achieved a 93% rate of reuse of reclaimed water and avoided an additional 17% in withdrawals from overused water resources. The St. Johns River WMD also takes a strong regulatory stance when permitting to promote reuse, but the applicant has the final right to determine feasibility. If the WMD determines that the applicant has biased the feasibility study, they will usually require additional supporting evidence. As a result of this policy, the district has achieved a 49% reuse of reclaimed water.

In the South Florida WMD, where the human population is concentrated, reuse is rarely implemented. One reason for this is that the WMD continues to allow wastewater utilities to use discharge methods that are significantly less costly. Many utilities depend on ocean outfall and underground injection discharges that are not discouraged in favor of reuse unless they represent expanded discharges. The WMD will continue to follow this policy unless stricter standards are established regarding

discharges so that costly reuse programs are offset by the more stringent regulations. As a result of this policy, the district has achieved only a 22% rate of reuse.

The Southwest Florida WMD has a different reuse policy. The WMD takes a strong regulatory position to encourage reuse implementation and the district uses a 50% funding match as a financial incentive to help build reclaimed water systems where feasible. As a result of this cost sharing policy, the district has achieved a 51% rate of reuse.

All districts are looking at reclaimed water as a significant alternative water supply resource and there is a general projection of increased reuse throughout the state. As the widespread use of reclaimed water is relatively new, issues regarding allocation and pricing are rare. Another issue is conservation of reclaimed water. Reclaimed water is a commodity that may be sold by wastewater utilities and is not directly regulated under the water management districts' consumptive use permitting rules. Most sources of water that are permitted require efficient water use, but these requirements do not currently apply to reclaimed water. These and other issues will probably be addressed in the context of broader state-wide water policy issues in the near future.

The scope of uses and standards of greywater and wastewater reuse are outlined in Chapter 62-610, Florida Administrative Code and Title XXIX, Public Health Chapter 381.0065 of the Florida Statutes. These policies mainly address reclaimed or secondarily treated water, but are also the only legal restriction close to greywater that Florida possesses.

Outstanding LAKEWATCH Volunteer

Bob Forbes has been an active volunteer for the Florida LAKEWATCH program from October 1996 through his recent retirement in May of this year. Bob said, "At my age I'm beginning to realize that the older I get the better I was, so I am retiring from Florida LAKEWATCH which I have enjoyed performing with my dogs: Chanel and Hugo." Bob's devoted four-legged assistants helped with the sampling duties from a 1965 Correct Craft dubbed the *Kennelcraft*. Originally, Bob requested to sample on Lake Dora since that is where he resides. However, another volunteer was already sampling Lake Dora so Bob would have been trained as a backup. Without hesitation, Bob decided to travel to Lake Carlton for sampling because he really wanted to participate as a primary sampler. Lake Carlton is located in both Lake and Orange Counties, but mainly in Orange County, on the Ocklawaha chain of lakes and is located at latitude N28° 45' 32" and longitude W81° 39' 29".

Bob retired from Eli Lilly & Company in Indianapolis as a pharmaceutical chemist in 1983 and was a charter member of the Indianapolis Sailing Club for about 30 years. Since he had a wooden Century Aerostat, a Larsen sailboat, an early wind surfer, and an 18-foot lightweight Grumman canoe, Bob needed a place with plenty of water so he could use all his watercraft. Bob said, "My wife would have preferred that we spend our retirement years in Santa Fe, New Mexico, but she knew the recreational waters there could not compare to those in Lake County, Florida."

Bob was attracted to the Lake County area because of the large number of lakes. He started exploring the lakes with his boat and joined the Antique Classic Boating Association. The association encouraged him to start leading water events in the Harris and Clermont Chain of Lakes. Bob has navigated the Dead River, Lake Harris, Helena

Run, Bugg Springs, and Lake Denham. Two major cruises were from Lake Dora to Palatka and also a few on the St. Johns River from Sanford to Jacksonville and back. He has also traveled on much of the Withlacoochee River, all of the Clermont Chain's eleven lakes, and from Gourd Neck Springs in the southern part of Lake Apopka throughout the entire Ocklawaha Chain. Very few boaters have navigated all of the wonderful waters that Bob has enjoyed exploring for the past 25 years.

Bob's recreational pursuits evolved into an interest in water quality. Since he wanted to learn more about water quality, he joined Florida LAKEWATCH to help collect data that could be useful for managing Florida lakes. He has also been involved with other organizations and government entities including the St. John's River Water Management District, Lake County Conservation Council, Friends of Lake Apopka, Trout Lake Water Center, and the Alliance to Protect Water Resources. Each spring, Bob has participated in a volunteer program called



Bob Forbes with his LAKEWATCH notebook at the 2008 Lake County Regional meeting.

the "Ibini Terra Clean-Up", which is an effort by the community to help clean our lakes and canal systems, that the Lake County Water Authority has sponsored for many years. Some years Bob helped by using his boat and other years by walking and wading. Although it is only a one-day affair, he believes that similar community efforts do make a great difference.

Bob has also monitored water levels in Lake Dora to investigate the effects of water fluctuations on the lake's vegetation and aquatic organisms. To keep tabs on these changes, he constructed various types of lake level gauges that were calibrated to the St. Johns River Water Management District (SJRWMD) standard, which uses mean sea level data as the baseline. Bob has checked the gauges daily for many years. He has records for Lake Dora since 1970 showing a historical high of 65 feet above mean sea level (msl) during January 1998 and a historical low of 60.1 feet above msl during July 2007. On February 20, 2008, the lake level was recorded at 61 feet above msl. The SJRWMD desires the lake level to range between 62 feet to 63.5 feet above msl.

Bob's interest, enthusiasm, and attention to detail in monitoring the lakes of Lake County are exemplified by his 12-year participation in the Florida LAKEWATCH program. It has been a pleasure working with Bob because his dedication in sampling Lake Carlton goes above and beyond anything we could have hoped for from a volunteer. We commend him for offering his time and energy. Since Bob has retired from sampling, Riley Warddrip has been trained to carry on the sampling of Lake Carlton using Florida LAKEWATCH procedures.

Florida LAKEWATCH

It's tough, it's tenacious, it eats trash..... **it's a Watergoat™**

Ahoy Neighbor! After every rain event tons of organic matter, debris, trash, and chemicals pour out of our stormwater pipes and into Florida's lakes, ponds, rivers, and intercoastal waterways. Like most of you, we have had more than our share of heartache, discouragement and frustration in dealing with this problem. With over a thousand people moving into Florida every day, we believe this problem is something that cannot be overlooked any longer. In fact, our inspiration was an environmentally minded little seven year-old named Mia who never failed to appreciate the beauty around her. So with a strong desire to make something happen that truly affects Florida's landscape, we set sail on a new adventure.

As founders of the Green Armada non-profit organization, we became increasingly frustrated because so much time was spent looking for funding, attending meetings, and addressing board members - definitely not our cup of tea! So while others were talking about doing something to clean up our environment, we decided to go out and actually do it. After a decade of collecting up to 400 to 700 pounds of trash per day from Tampa Bay's waters, one piece at a time, we decided to stop the trash at its most concentrated source - the outflows of stormwater pipes. As a result, the concept of the Watergoat™ as a cost-effective, efficient water clean up strategy was born.

By combining the joint efforts of corporations, citizens, and municipalities we envisioned tackling the floating debris problem and water quality of Florida's waterways - much like the folks at Florida LAKEWATCH. With research, engineering, and business plan in hand we started knocking on doors (mainly those of City Halls), reminding our municipalities that the stormwater systems in place today are



A watergoat deployed in a lake in Hillsborough County.

basically the same as those used by the Romans over 2,000 years ago. Realizing that our state and local governments have limited budgets and are often unable to allocate the manpower or devices to deal with this growing problem, we designed the Watergoat™. This piece of equipment provides an affordable solution for anyone who desires cleaner shorelines and water systems including concerned citizens, mayors, and even CEOs.


So why do we call it the Watergoat™? Because it is tough, tenacious, and it "eats" trash before it has a chance to spread throughout the water body. The Watergoat™ is affordable with prices starting at \$400. Its attributes include the ability to raise and lower with rising and falling water levels and the capacity to contain hundreds of pounds of trash after a rain event without blocking the water flowing through the stormwater system. The Watergoat™ also serves as an, or important educational tool by showing the community that a gum wrapper or Styrofoam cup tossed into the street a mile away could easily end up floating in their lake, pond or stream if it was not captured by the Watergoat™ first.

The Watergoat™ can be customized to any application from drainage ditches to stormwater outflow pipes

measuring up to 48 inches in diameter. The Watergoat™ is constructed of a welded aluminum frame that is reinforced with zinc plating to prevent corrosion. It is designed and engineered to withstand strong water velocity from outflow pipes. A rubberized nylon net basket hangs from the structure and effectively contains the stormwater debris within the Watergoat™ itself. This environmentally friendly device is safe for wildlife and maintaining it is a snap - all you need is a dip net, a garbage bag, and about five minutes a week to clean it out. As suggested by Dr. Dan Canfield, in the near future we plan to add absorbent sponge booms that soak up gasoline, motor oil, and diesel fuel before it enters a water body. This addition will enable the Watergoat™ to trap both trash and chemical substances, effectively keeping them out of our water bodies. How cool is that?!

The companion in this clean water system is the Watergoat™ Island. We engineered our Watergoat™ Island to be the least expensive, yet most effective, floating wetland on the market. It is built on a 5 foot by 12 foot floating aluminum frame and is equipped with a solar panel and aerating pump to improve the absorption of nitrogen by the root systems of the native non-invasive

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Florida 
LAKEWATCH

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It's tough, it's tenacious, it eats trash....it's a Watergoat™ (Continued from page 11)

plants growing in the frame. This makes the perfect companion to littoral plantings because if the water level recedes from the sides of the lake or pond, the Watergoat™ Island continues to filter the remaining water in the middle of the lake.

Just a hundred years ago, Florida was a vast wilderness of beautiful wetlands and forests. In just a few decades, we have altered the watershed with concrete, asphalt, and impervious surfaces that contribute more stormwater at a higher rate than before. We have a right and responsibility to do what we can to mitigate the negative effects of increased stormwater inputs. We applaud all the volunteers and staff members of Florida LAKEWATCH, an organization that truly knows how to get things done. In the future, we will be installing components of the Watergoat™ System throughout the entire State of Florida – hopefully

with the help of major corporations, municipalities, and concerned citizens like you. Currently the Watergoat™ is working in St. Petersburg, Tampa, Miami, and Destin and is coming soon to a lake or pond near you. We strongly believe that corporations want a tangible return on their “green investment”. The Watergoat™ System provides documented results. Having operated in the non-profit world, we know that funding sources require documented results too. The Watergoat™ System provides documented results so that organizations like Florida LAKEWATCH can continue to work with concerned citizens and clean Florida's waterways. In keeping with our philosophy, a portion of our proceeds will be going back to the Florida LAKEWATCH program. Please contact Mark S. Maksimowicz at earth101@newearthindustries.org (727) 459-2301 or check out our website at: www.watergoat.org