Florida LAKEWATCH

Dedicated to Sharing Information About Water Management and the Florida LAKEWATCH Program Volume 54 (2011)

Amy Richard

Lake Grasshopper in Lake County, FL.

Why are nutrients so important? - Total Phosphorus

In our last two issues of the Florida LAKEWATCH newsletter we have introduced you the EPA's new nutrient criteria and some recent actions that the Florida DEP has taken with LAKEWATCH to address these criteria. If you will remember, the criteria were set for total phosphorus, total nitrogen and chlorophyll all of which LAKEWATCH volunteers sample on a regular basis. In the next three volumes we would like to give you a little information on each of these "parameters" to show you why the work of LAKEWATCH volunteers is so valuable. For this volume we will start with total phosphorus sometimes abbreviated as TP. In order to understand the importance of TP we will first look at all of the forms of phosphorus in your waterbody.

About Phosphorus

Phosphorus is an element that, in its different forms, stimulates the growth of algae in waterbodies. Phosphorus compounds are also found naturally in many types of rocks and soils. In fact, phosphorus is mined in Florida and other parts

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Amy Richard

A limiting nutrient is a chemical necessary for plant growth — but is available in smaller quantities than needed for the plant or algae to increase their abundance.

of the world for a variety of agricultural and industrial uses. In most freshwater lakes in Florida, the limiting nutrient is believed to be phosphorus rather than nitrogen.

A limiting nutrient is a chemical necessary for plant growth — but is available in smaller quantities than needed for algae to increase their abundance. Once the limiting nutrient in a waterbody is exhausted, the population of algae stops expanding. If more of the limiting nutrient is added, larger algal populations will result until their growth is again limited by nutrients or by other limiting environmental factors.

In waterbodies, phosphorus occurs in **dissolved** and p**articulate** forms. **Dissolved phosphorus** is defined based on its size, as that which is small enough to pass through a 0.45 micron filter. It includes phosphorus forms like soluble reactive phosphorus and soluble organic compounds that contain phosphorus.

Its counterpart **particulate phosphorus**, is too big to pass through a 0.45-micron filter. It is formed when phosphorus becomes incorporated into particles of soil, algae, and small animals that are suspended in the water. Both dissolved and particulate phosphorus can change from one form to another very quickly (called cycling) in a water body and there is ongoing scientific inquiry about when, where, and how often these specific forms of phosphorus are found in waterbodies.

This is important because algal cells and plants can only use phosphorus in certain forms.

Understanding the relationship between algae and phosphorus is further complicated by the fact that an algal cell's ability to use specific forms of phosphorus is strongly influenced by several factors including pH, water hardness (caused by the presence of calcium and/or magnesium), the amount of dissolved oxygen in the water, and thermal stratification (layers of water having different temperatures).

This process of phosphorus cycling makes it difficult to measure dissolved or particulate phosphorus in a waterbody at a given time. However, **total phosphorus** concentrations (abbreviated TP), which include both dissolved and particulate forms, can be used to gain an estimate of the amount of phosphorus in a system. The reason that TP is so important and why Florida LAKEWATCH measures it is because it provides a snapshot of the total phosphorus concentrations in a lake at a given time.

Amy Richard

Florida LAKEWATCH measures TP because it provides a snapshot of the total phosphorus in a lake at a given time.

There are many ways in which phosphorus compounds find their way into waterbodies. Some of the more common pathways are described as follows:

_ Some areas of Florida and other parts of the world have extensive phosphate deposits in the soils. In these areas, rivers and water seeping or flowing underground can become phosphorus enriched and may carry significant amounts of phosphorus into waterbodies.

_ Sometimes phosphorus is added intentionally to waterbodies as a management strategy to increase fish production by fertilizing aquatic plant and algal growth.

_ Phosphorus can enter waterbodies inadvertently as a result of human activities like landscape fertilization, crop fertilization, wastewater disposal, and stormwater run-off from residential developments, roads, and commercial areas.

Total Phosphorus and Biological Productivity

One major task that lake experts are faced with in water quality management is assessing the **biological productivity** of a waterbody — and determining whether it's changing over time. However, overall biological productivity is difficult to measure in a waterbody because it involves measuring many different parameters over a period of time. Such an approach would be prohibitively expensive and time consuming. Because of this, many aquatic scientists use **total phosphorus** measurements, often alone, as an indirect way of assessing the biological productivity of a waterbody.

Why? Because phosphorus is one of the main nutrients that can limit the biological productivity of a waterbody. However, this is not always the most accurate way to assess the biological productivity of a waterbody. Other factors may also limit biological productivity, such as availability of light.

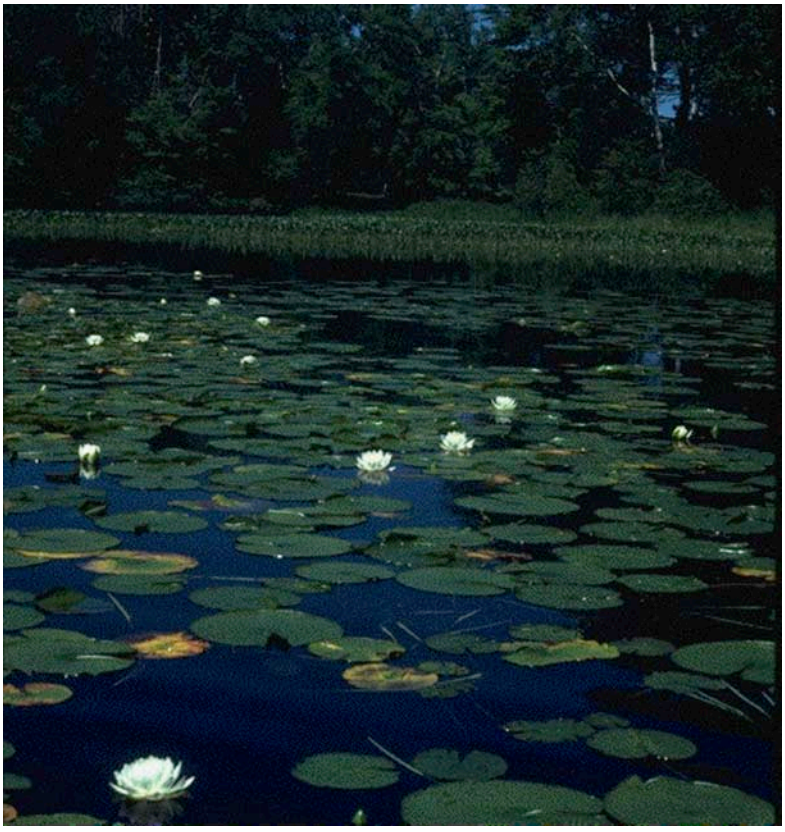
Phosphorus As A Limiting Nutrient

Because phosphorus is frequently the limiting nutrient in the growth of free-floating algae in lakes, it is strongly believed in the scientific community that waterbodies with *higher* phosphorus levels will have *higher* levels of algae and water- bodies with *low* phosphorus concentrations will have *lower* levels of algae. This belief is based in part on surveys of lakes, both in Florida and throughout the world, and on results of whole- lake experiments.

Consequently, aquatic scientists almost always recommend the manipulation of phosphorus, called phosphorus control, as a primary management strategy for controlling algal biomass.

The high priority placed on phosphorus control by regulatory and professional management agencies in Florida is evidenced by its use in the multi-million dollar lake management programs at Lake Apopka and Lake Okeechobee. However, phosphorus is not always the limiting nutrient and phosphorus removal may not be the best management approach to controlling algal biomass.

So you can see why phosphorus is so important in managing Florida's waterbodies and how important it is to know how much phosphorus is in each lake. This is why the work of all of the LAKEWATCH volunteers is so important not only for their own lakes but for understanding and managing all of Florida's waterbodies.



Marlyn Bachman

Biological productivity is difficult to measure in a waterbody because it involves measuring many different parameters over a period of time.

Living With Gulf Sturgeon

By The Florida Fish and Wildlife Conservation Commission

It's an ugly fish with a face only another sturgeon could love. It's the prehistoric-looking, sucker-mouthed, scute-covered Gulf sturgeon and it's creating quite a stir on the rivers in North Florida.

Although the sturgeon residing in the Suwannee River have received the bulk of the media attention during the last several years, the fish are present in quite a few rivers in the northern portion of the Sunshine State.

The sturgeon can trace their roots back 200 million years. And even though they're just doing what they've been doing for eons, it's causing a problem for some boaters. The Gulf sturgeon makes its presence known by jumping out of the water. With adult fish reaching up to eight feet in length and weighing up to 200 pounds, they can make quite a splash.

The problem

Boaters have been injured while traveling on the Suwannee River and other rivers in the Florida Panhandle when they are struck by the jumping fish. There's no apparent warning … the sturgeon just jump. If a boater is in the wrong place at the wrong time, there's a chance of injury.

In 2006, nine people were injured by direct strikes with sturgeon. Two people were seriously injured when they swerved their boat to avoid a jumping sturgeon and hit a bridge piling. In 2007, nine people were also injured by

OSCAR SOSA/FOR THE NEW YORK TIME

A large sturgeon is seen jumping out of the Suwannee River in June 26, 2007

a jumping sturgeon. A man drowned when he was thrown from a boat when the operator swerved to avoid a jumping sturgeon. During 2008, there were three incidences of sturgeon jumping into boats. Three people were injured during these encounters.

The biology

Scientists believe there are approximately 10,000-14,000 Gulf sturgeons that make the Suwannee their summer home, with far fewer numbers in the six other major U.S. rivers where Gulf sturgeon are known to spawn. The Suwannee River, which flows from the Okefenokee Swamp in southeastern Georgia down through northern Florida, is one of the most pristine rivers in the country - with no dams for returning sturgeons to contend with.

The Suwannee is considered one of the last "wild" rivers in Florida.

The fish use almost the entire length of the river to complete their complicated life history. The sturgeon spawning grounds on the Suwannee are 140 miles (220 kilometers) upstream from the mouth. Unlike salmon, which die after spawning in freshwater, sturgeons - which can live to be 25-plus years old – spend summer in the river, then swim back down the river to winter in the Gulf.

Sturgeon return to the eastern Gulf of Mexico during the winter, where they feed heartily. They typically do not eat while they are in the river - losing somewhere around 20 percent of their body mass. Because of this extended fast, biologists wonder why the fish would use energy jumping out of the water.

When they do eat, Gulf sturgeons are bottom feeders. They have barbles, catfish-like whiskers, that help them search sediments for

prey, which they vacuum up with their sucker mouths.

Despite their long history, Gulf sturgeons were listed as threatened under the Endangered Species Act in 1991. The sturgeon is listed as a species of special concern in the state of Florida.

Why are these fish listed? There are many reasons. Their Gulf-wide habitat has been destroyed or greatly altered. Dams have prevented the sturgeon from migrating to old spawning areas. Dredging and other navigation maintenance may have eliminated the deep holes where sturgeon congregate. They were overfished to the point where Florida took the unprecedented action in 1984 of banning harvesting, capture, or "take" to prevent their extinction, just as we did for Bald Eagles. To make things even tougher for the sturgeon, it takes many years for the fish to reach breeding age, slowing population recovery.

What FWC has done

When the reported strikes began increasing in 2006, FWC mounted an intense public awareness campaign to let people know these fish were present and could injure those boaters enjoying the Suwannee. The agency message of "Go slow on the Suwannee" for better reaction time if a sturgeon did leap out of the water was stressed.

Signs were posted at all Suwannee River boat ramps and "Go Slow" decals were handed out to remind boaters to go slow while traveling on the river.

FWC personnel coordinated with

FWC

FWC LE Officer Bret Gill holds a Gulf Sturgeon mount.

elected officials from the five counties in north Florida affected by this issue.

A news release was put out in the spring, alerting boaters that the fish are migrating back into the Suwannee from the Gulf of Mexico.

What boaters can do

Go slow: The best course of action is to go slow. This gives more time to react and if you are hit, the force of the blow is much less at 10 mph than it is at 35 mph.

Wear your life jacket: Some boaters don't like wearing a life jacket due to its bulkiness or fit. However, there's been a revolution in life jacket design, and there are lighter, more compact and less restrictive models on the market. They include lightweight over-the-shoulder and belt-type inflatables, in addition to vest-type life jackets. If you're hurt and unconscious, a life jacket will help keep you afloat.

Be alert: Pay attention to your surroundings. If you're in an area where you see sturgeon jumping, slow down and get closer to the shoreline. The fish tend to stay in the deeper sections of the river.

Designate an operator: Don't boat and drink. If you're impaired, you have slower reaction times. If alcohol is consumed on a vessel, there should be a sober designated operator.

Boat safe: Keep passengers off the bow of the boat.

The Suwannee River is a beautiful part of Florida and should be enjoyed. The FWC wants boaters to know that these fish are out there and they do jump. Just be prepared, go slow and have fun.

Clean Water Act Update

Written by Steve Colvin, North American Lake Management Society Government Affairs Committee

The Clean Water Cooperative Federalism Act of 2011 (H.R. 2018) was introduced in the House of Representatives by Rep. John Mica (FL) and 39 co-sponsors on May 26, 2011. It passed the House on July 13, 2011 and was read in the Senate on July 18, 2011. At present, it has not been assigned to a Senate committee. Current information on the bill can be found at: http://thomas.loc.gov/cgi-bin/bdquery/z?d112:h.r.02018:

This Bill amends the Federal Water Pollution Control Act, better known as the Clean Water Act. Section 2 is a key part of the Bill, and it prohibits EPA from: (1) promulgating a revised or new water quality standard for a pollutant when the Administrator has approved a state water quality standard for such pollutant unless the state concurs with the Administrator's determination; (2) taking action to supersede a state's determination that a discharge will comply with effluent limitations, water quality standards, controls on the discharge of pollutants, and toxic and pretreatment effluent standards under such Act; (3) withdrawing approval of a delegated state NPDES program, limiting federal financial assistance for a state NPDES program, or objecting to the issuance of a state NPDES permit on the basis that the Administrator disagrees with the state regarding the implementation of an approved water quality standard or the implementation of any federal guidance that directs the interpretation of such standard. A Fourth provision of this section prevents EPA from prohibiting the specification of any defined area as a disposal site for the discharge of dredged or fill material into navigable waters and denying or restricting the use of such area as a disposal site in a permit if the state where the discharge originates does not concur with the Administrator's determination that the discharge will result in an unacceptable adverse effect on municipal water supplies, shellfish beds, and fishery areas.

Section 4 of the Act shortens the deadline for United States Fish and Wildlife Service comments on a general dredge and fill permit application. It requires EPA and other agencies to submit comments on an application for a general permit or a permit to discharge into navigable waters within 30 days (or 60 days if additional time is requested) after the date of receipt of such application.

Other portions of the Act that may be of interest are Section 6, which requires EPA to report on any increase or reduction in waterborne pathogenic microorganisms, toxic chemicals, or toxic metals in waters regulated by a state under this Act; Section 7, which prohibits this Act from being construed to limit EPA's authority to regulate a pipeline that crosses a streambed; and Section 8, which requires EPA to analyze the impact, disaggregated by state, on employment levels and economic activity before issuing a regulation, policy statement, guidance, response to a petition, or other requirement or implementing a new or substantially altered program under the Clean Water Act.

Marlyn Bachman

Current information on the bill can be found at: http://thomas.loc.gov/cgi-bin/bdquery/z?d112:h.r.02018:.

Volunteer Bulletin Board

New Collection Centers

Lee County
Lover's Key State Park
8700 Estro Blvd.
Fort Myers, FL 33931
Contact: Gloria Beauchamp
239-463-4588

Sumter County
Sumter County IFAS Extension Village Annex
8033 East County Road 466
Lady Lake, FL 32159
Contact: Lloyd Singleton
352-689-4668

Monthly Sampling Is Back!

LAKEWATCHer's, we are requesting that all samplers who sample fresh water lakes, springs, rivers, etc. begin to sample your water body on a monthly basis again. Because LAKEWATCH's water lab is now in position to handle more freshwater samples we are able to process freshwater samples on a monthly basis once again. Sorry all of you salt-water LAKEWATCHer's, due to the extra time and personnel involved with salt-water analysis, we are not able to resume monthly sampling for you at this time so you should continue to sample every other month.

Lab Reminder!

Please remember to pour out excess water down to shoulder of your sample bottle. This will allow for expansion of your water sample upon freezing and the bottle will not be stressed.

DEP SECRETARY APPOINTS GREGORY M. MUNSON AS DEPUTY SECRETARY FOR WATER POLICY AND ECOSYSTEM RESTORATION

~Secretary Vinyard also appoints Dr. Ann B. Shortelle as Water Policy Director~

TALLAHASSEE — Florida Department of Environmental Protection (DEP) Secretary Herschel T. Vinyard Jr. today announced the appointments of Gregory M. Munson as Deputy Secretary for Water Policy and Ecosystem Restoration and Dr. Ann B. Shortelle as Water Policy Director. Deputy Secretary Munson and Dr. Shortelle will coordinate state water policy development and implementation, specifically as it relates to the Water Management Districts. Deputy Secretary Munson will start at DEP on August 22 and Dr. Shortelle will start at DEP on August 30.

"One of my top priorities is getting Florida's water right, and DEP is committed to helping Florida's Water Management Districts focus on their core mission responsibilities," said Secretary Vinyard. "This means that DEP will take a more active role in Water Management District water supply program development, protection of water resources and regulatory policies."

On April 12, 2011, Governor Rick Scott directed DEP to exercise statutory obligation to supervise activities of the state's five Water Management Districts, including their water supply and regulatory activities, to ensure statewide consistency is achieved. Further, DEP is directed to ensure that the core responsibilities of the Districts are consistent with Chapter 373, FS for managing the state's water resources.

"It is my intention to collaborate with the Water Management Districts on these types of discussions and decisions as they are being made," said Deputy Secretary Munson. "I fully anticipate sitting down with each district and discussing priorities and budget options, so that there is a common understanding of what the focus is going forward."

The Deputy Secretary for Water Policy and Ecosystem Restoration is a new title within DEP. Previously, DEP had a Deputy Secretary for Policy and Planning. Those duties have been divided up between the Deputy Secretary for Water Policy and Ecosystem Restoration and the Chief of Staff. The modification of this position confirms Governor Scott's desire to focus on water and ecosystem priorities. In addition to working with the Water Management Districts, the Deputy Secretary for Water Policy and Ecosystem Restoration will also oversee the DEP's Office of Ecosystem Projects, which coordinates and assists with the policy development and implementation of a variety of restoration projects, including Everglades restoration.

"I look forward to working with the Water Management Districts to develop clear and consistent policies to effectively manage our water resources across district lines," said Dr. Shortelle. "By opening a regular, two-way dialogue with the Water Management Districts, I know we can work together to address flood protection, water supply and quality, and resource protection in a fiscally responsible manner."

The Water Policy Director is a new position that will work directly with Secretary Vinyard and Deputy Secretary Munson on overseeing Water Management District activities, including water supply, water quality, management and resource regulation, guiding rulemaking activities and evaluating land acquisition programs.

The Water Policy Director will also promote statewide water management consistency taking into account the differing, regional

characteristics of Florida's water resources.

About Gregory M. Munson
Deputy Secretary Munson began his career in the U.S. Air Force after graduating from the United States Air Force Academy in 1989. He earned several Aerial Achievement Medals as a Mission Director on the RC-135 intelligence-gathering aircraft, and resigned from the Air Force as a Captain in 1995. He attended Vanderbilt University Law School. In 1998, Mr. Munson clerked for the Honorable J.L. Edmondson on the United States Court of Appeals for the Eleventh Circuit.

Mr. Munson moved to Florida in 1999 to become an Assistant General Counsel to Governor Jeb Bush, where he served until 2002. In 2002, Mr. Munson became an assistant United States Attorney for the United States Department of Justice in Miami, Florida. Mr. Munson became General Counsel for the Florida Department of Environmental Protection (DEP) in 2004. As the state's chief environmental lawyer, he was involved in litigation and negotiations surrounding America's Everglades, Total Maximum Daily Load program, and the tri-state water dispute between Georgia, Alabama, and Florida. He personally participated in the defense of Florida's rules to reduce emissions from utility plants, and the defense of Florida's beach restoration program, ultimately resolved in favor of FDEP by the U.S. Supreme Court in 2010, in Stop the Beach Renourishment Inc. v. Florida Department of Environmental Protection.

He became General Counsel for WRS Infrastructure & Environment, Inc., now WRScompass, in February, 2007. WRScompass is a full-service environmental remediation firm that performs large scale environmental remediation and civil construction projects, including restoration work in the Florida Everglades, cleaning up Superfund sites on behalf of the United States Environmental Protection Agency, expanding levees in Louisiana in the aftermath of Hurricane Katrina, and performing technologically complex remediation for several Fortune 500 clients.

About Dr. Ann Shortelle
Dr. Shortelle has over 25 years of professional experience in lake, riverine, and reservoir management for water quantity and quality, surface water/wetlands restoration enhancing water quality and source water protection, surface water modeling, permitting and environmental assessments. Since receiving her Ph.D., Dr. Shortelle has worked in the private sector as a consultant, serving recently as MACTEC Engineering and Consulting, Inc.'s (now AMEC E&I, Inc) Chief Scientist in Florida, and Water Practice Leader. She joined MACTEC in 1988 and has served as a chief scientist, senior principal and senior project manager. She has managed numerous projects related to restoration, siting/licensing, mitigation planning, source water evaluation, and natural resource damage assessment. She has served as a technical expert and reviewer, and has served as an expert witness. She has conducted, participated in, managed, directed, and provided technical oversight for hundreds of projects in the State of Florida, the United States, and Puerto Rico. She has conducted trainings and workshops related to water quality, quantity, and sustainability, and given numerous papers at professional conferences. Shortelle has authored/ co-authored more than 40 publications and presentations on environmental and ecological topics.

Dr. Shortelle is a member of the North American Lake Management Society, the American Water Resources Association, and other professional organizations. She is currently serving on the North American Lake Management Society's Board of Directors, and was a former two term member of the Florida Lake Management Society Board of Directors and served on the policy advisory committee to DEP for designated use and classification refinement for surface waters. She holds a Ph.D. in limnology from the University of Notre Dame and a B.S. in biology from Mercer University.

LAB NOTES

From Florida LAKEWATCH Chemist

Claude Brown

As we return to monthly sampling the lab staff would like to review some techniques for new folks and a reminder for dedicated samplers regarding water sample collection and data sheets.

The lab makes every effort to inspect water bottles that are sent out to collection centers for volunteers. We remove discolored and frail bottles weakened by reuse and multiple washings, but chances are a few make it out to our volunteers. When writing your information on the bottles County/Lake /Date/Station—just look the bottle over quickly as a simple routine. If any appear suspect to you then use one from another Ziploc pack.

We would like your help in making sure your samples arrive safe and sound. To this end, we want to emphasize the standard LAKEWATCH protocol for water sampling.

Please remember to fill sample bottles completely. **Then** shake or pour out excess down to shoulder of bottle. This will allow for expansion of your water sample upon freezing and the bottle will not be stressed. Bottles become stressed from having too much water in them. Over-filled bottles look swollen and often fall over when set upright. These bottles tend to rupture in transport, especially if there are a lot of bottles picked up during a collection run.

The samples in these cracked bottles can become contaminated from partial thawing and refreezing in transport. Once they are in the lab we try to recover samples, but results from cracked bottles are often suspect and some are simply lost.

To insure your sampling efforts yield quality results, please take the time to note the level of water collected in your water sample bottle prior to freezing. If it looks like it is filled to the brim, gently pour off a little of the excess and recap before freezing. The water level should be as shown in the diagram to the right.

On a final note, don't forget to take your Secchi transparency readings every month. Sometimes we receive water samples with no information as to the date of sampling. Extra blank data sheets can be found at all our collection centers, and if necessary we can mail you some. The importance of your data sheets cannot be over emphasized. These snapshots in time provide our data managers a way to evaluate lake conditions. Variability in Secchi visibility is the most observable way to detect underlying changes in lake conditions. These observations help make sense of the water chemistry samples collected on the same date as well as potential changes in observed water chemistry over the next few months. Thanks to all our volunteers for their continued sampling and support.

Remember the Old Salt's Proverb…

"Time Spent on the Water is not Deducted from One's Lifespan!"

Outstanding LAKEWATCH Volunteer

James (Jim) Barkuloo has had a full life from his beginnings in Georgia till his retirement years in Panama City. Jim was born in Tifton, Georgia in 1929. He attended Abraham Baldwin Agricultural College in Tifton from 1946-47 before his schooling was interrupted for a four year stay with the U.S. Army Airborne Paratroopers. When Jim left the Army he returned to his schooling at Abraham Baldwin moving on to Auburn University (1951-1953) and then Florida State University where he received his B.S., in biological Sciences in 1955.

Anne Ake

Jim out on St. Andrew Bay.

After receiving his B.S. Jim went to work for the Florida Game and Fresh Water Fish Commission (now called Florida Fish and Wildlife Conservation Commission) where he spent ten years as a Fisheries Biologist from 1957 -1967. During the last four years he also found time to return to school and earned a MS in Zoology from Stetson University in 1967.

After receiving his MS Jim left the Game Commission and Florida and went to Washington DC to work for the USFWS followed by a brief stint as the Assistant Coop leader at the Alabama Cooperative Fisheries Unit in a return to Auburn University from1969-1970.

It was in 1970 that Jim returned to Florida and began his work on the coastal systems of the Gulf of Mexico. From 1970 until 1990 Jim worked protecting, preserving and understanding the coastal ecosystem of the Gulf coast. When he retired in 1990 Jim was the Supervisor of the U.S. Fish and Wildlife Service, where he represented the USFWS on the Department of Interior's Outer Continental Shelf Oil and Gas Advisory Board for the Gulf of Mexico.

Jim's retirement was short lived as soon a new opportunity came knocking. In January 1990, Dr. Jack Taylor designed and initiated Baywatch, a citizen volunteer water quality monitoring program.

The impetus to create the water quality sampling program came from the St. Andrew Bay Resource Management Association (RMA). This non-profit organization conducts the monitoring program, and is responsible for sampling station selections, water collections and analyses, data management and distribution, and program coordination with other agencies and environmental groups. It is designed as a long-term project to periodically and systematically test and evaluate aquatic conditions throughout the St. Andrew Bay estuarine system and Lake Powell.

Dr. Taylor began the RMA program in conjunction with the University of Florida as a "LAKEWATCH" program, and UF is still the major partner in the water quality sampling effort.

Jim joined Baywatch back in 1990 and began his relationship with Florida LAKEWATCH sampling West Bay" Since February of 1990, West Bay has been sampled for 169 months almost exclusively by Jim. For over 20 years Jim has faithfully watched over the St. Andrew Bay system and the Baywatch Coordinator since the mid 1990's.

Florida LAKEWATCH
Fisheries and Aquatic Sciences
School of Forest Resources and Conservation
7922 NW 71st Street
Gainesville, FL 32653

Florida
LAKEWATCH

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Florida LAKEWATCH
Fisheries and Aquatic Sciences
School of Forest Resources and Conservation
7922 NW 71st Street
Gainesville, FL 32653
or call
1-800-LAKEWATCH (800-525-3928)
(352) 392-4817
E-mail: fl-lakewatch@ufl.edu
http://lakewatch.ifas.ufl.edu/

All unsolicited articles, photographs, artwork or other written material must include contributor's name, address and phone number. Opinions expressed are solely those of the individual contributor and do not necessarily reflect the opinion or policy of the Florida LAKEWATCH program.

We rarely come across volunteers like Jim whose dedication and service to St. Andrew Bay goes beyond anything we expected from a volunteer when the program was created. We commend him for the time and energy and for his continued service to LAKEWATCH, Baywatch and St. Andrews Bay.

LAKEWATCH SAYS THANK YOU!

Visit www.sabrma.org to learn more about RMA's Baywatch Program.

Anne Ake

Jim taking a Secchi disc measurement on West Bay in St. Andrew Bay, Panama City, Florida.