Florida LAKEWATCH

Dedicated to Sharing Information About Water Management and the Florida LAKEWATCH Program Volume 39 (2007)

The Florida Atlas of Lakes

Florida LAKEWATCH, the Florida Center for Community Design and Research at the University of South Florida and the Florida Lake Management Society have teamed up to provide easy access to data for all LAKEWATCH lakes. This new service will soon be implemented as the "Florida Atlas of Lakes" found at the Water Atlas website (www.wateratlas.org).

The existing Water Atlas Program from the University of South Florida provides water resource data via the World Wide Web for a nine county region stretching between Pinellas County on the west coast and Seminole County and, soon, Volusia County on the East Coast and Leon County in the Florida Panhandle. The extension of the coverage of the Water Atlas to anyone with a web browser has always been a major goal of the Water Atlas program. Until recently the program has not had the manpower, funding or technology to achieve this goal. However, a combination of new designs and new technologies has now made this goal possible. This year we will make a step in that direction with the Florida Atlas of Lakes. While this new statewide atlas will not have the full comprehensive functionality of the existing county Water Atlases, it will have the key water chemistry data that is generated by the Florida LAKEWATCH program.

The Water Atlas project manages and delivers data through a map interface. LAKEWATCH sites are matched to map themes based on the 1:24,000 scale National Hydrology Database (NHD). Additional map themes are then added to the base map to create the map that is used as a key element of the database. Figure 1 shows Water Atlas web-based map with the Florida Atlas of Lakes Themes added. Additional themes, including the 2004 aerial photographs for lakes, will be added as the project matures. Data is managed and displayed on water resource pages.

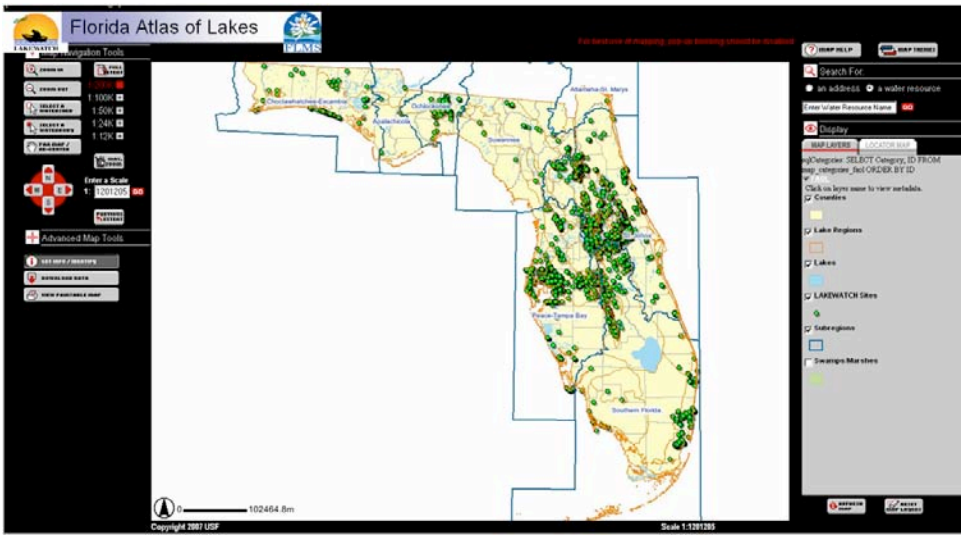

Figure 1. ArcIms map page showing themes, Florida Lake Regions and Counties and various lake locations with LAKEWATCH data.

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The Florida Atlas of Lakes (continued from page 1)

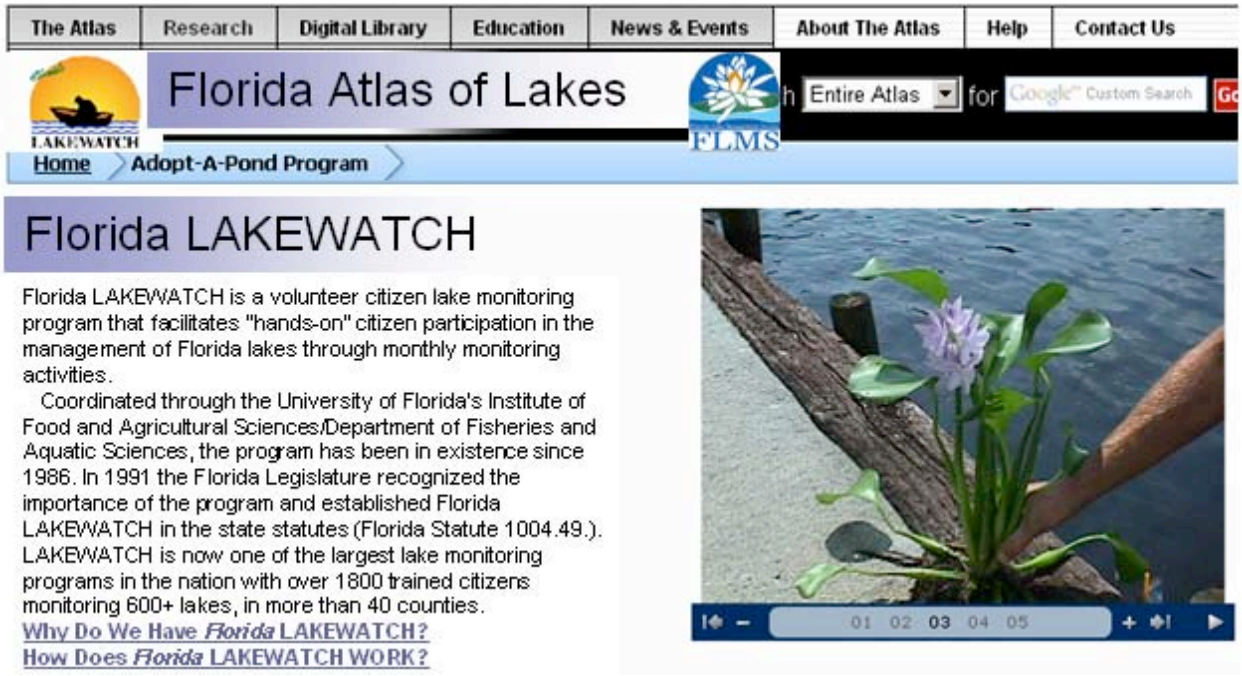


Figure 2. Florida Atlas of Lakes program page.

The Florida Atlas of Lakes web page structure will include over 600 resource pages and program pages (Figure 2). Page types are managed through a web page administration function which will allow volunteers and staff to personalize text, add photos and communicate via announcements and web-based forms.

When implemented in October 2007, the Florida Atlas of Lakes will allow the citizens of Florida to better understand and appreciate the important work that is done on their behalf by Florida LAKEWATCH volunteers. Users will be able to view data for any of the waterbodies in the Florida LAKEWATCH program. Look for future announcements in our newsletter and website as the atlas release date nears.

The home page for the wateratlas web site (www.wateratlas.usf.edu).

To view an existing county water atlas or for more information about the family of water atlas web sites visit

www.wateratlas.usf.edu

What About Bulkheads?

One of the major topics at the Florida LAKEWATCH regional meetings concerns the use of erosion control structures such as bulkheads, seawalls, riprap, and retaining walls. The questions usually deal with the pros and cons of the structures and how they may affect the plant and animal life associated with the shoreline as well as permitting procedures.

What are bulkheads?

The Florida Department of Environmental Protection (FDEP) defines a bulkhead or seawall as a man-made wall or encroachment, designed to protect upland property and structures from the force of waves that create shoreline erosion.

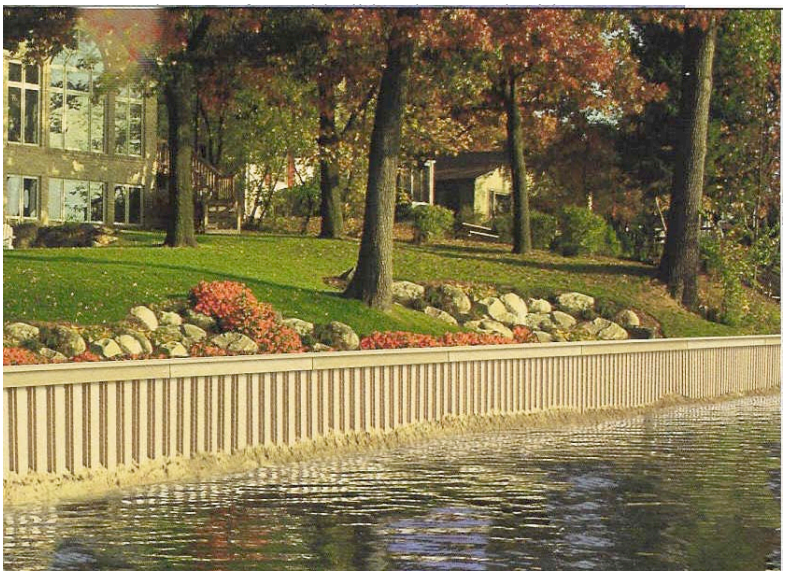
What are the effects of bulkheads on the habitat and the organisms that utilize that area?

There is a lot of information on the installation of bulkheads, the materials used in their construction, and many site specific engineering reports. However, there has been limited research concerning the effects of such structures on the habitat and the community of aquatic organisms.

Scientist in 1998 compared the complexity of macroinvertebrate communities utilizing the littoral zones of lakes.
The study was designed to compare riprap, vertical retaining seawall, and natural shoreline. Wire baskets were used to simulate riprap and concrete blocks to simulate retaining seawall. Higher numbers of organisms and more species were found colonizing baskets than blocks, however, neither abundance nor number of species differed statistically among substrate types. The scientist concluded that riprap, being a 3-dimensional artificial substrate, would offer more surface complexity and interstitial space for macroinvertebrate communities than would a 2-dimensional artificial substrate like a sea wall.

The Texas Parks and Wildlife Department also did a study concerned with the number of bulkheads being placed on Lake Conroe in Texas which was published in the Reservoir Newsletter Volume 2, Issue 1 March 1994 Southern Division, American Fisheries Society. It compared electrofishing samples between cleared, bulkhead, and riprap shoreline treatments. They observed that juvenile fish were more common in the riprap shoreline and as a result were able to convince the Army Corp of Engineers to require riprap in at least 50% of any bulkhead structures on Lake Conroe.

Two additional studies investigated copper arsenate (CCA), which has become a concern in regard to human health. In these 1993 studies scientist collected oysters, fish, and worms from a canal that was lined with CCA treated wood. These organisms had elevated levels of copper and arsenic in their tissues compared to organisms collected at a reference site without treated wood. Worms with the elevated metal concentrations in their tissues were then fed to fish in a controlled study. After one month the fish showed no significant trend in survival or growth when compared to fish fed uncontaminated worms. Since the study showed that these metals can bioaccumulate in the tissues of animals, more research is warranted.



www.wilhelmlandscapes.com

A vinyl sea wall constructed on a lake in Michigan.

Subsequently, these same scientists in 1994 evaluated the fine particle fraction of sediment collected near CCA treated wood. They found high levels of the metals in the fine particle fraction of sediment, but also pointed out that fine particles made up only 1% of the sediment samples and that the sediments did not show consistent copper and arsenic levels. Benthic community analysis showed reduced species richness and diversity when compared to uncontaminated reference sites. The results of these studies indicate that materials without CCA should be used if possible or that materials should be treated with less toxic wood preservatives that is available on the market.

Permitting Procedures

The FDEP is responsible for permitting bulkheads and/or seawalls. This state agency recognizes the need to protect structures from the effects of erosion while also acknowledging that bulkheads may have negative impacts on the environment. The installation of seawalls should be designed to minimize damage to the shoreline habitat. Bulkheads should only be placed where the soil composition and water activities are susceptible to erosion and shoreline damage.

There are two basic types of regulations for bulkheads or seawalls: permits and exemptions. Exemptions for installation and repair of bulkheads of set lengths and orientations are defined in Section 403.813 of the Florida Statues. Exemptions as listed in this chapter do not have to seek authorization from the FDEP because of their nature and scope. Going outside these specified exemptions require permitting from state and local government.

Continued on page 4.

What about Bulkheads? (continued from page 3)

Need a permit?

In order to get a permit to protect habitable structures, the following criteria must be met:

- The structure should not be on a foundation designed to withstand undermining by storm erosion.
- Non-inhabitable structures can also be protected if their failure would damage a habitable structure or cause major damage to public infrastructure.
- The structure should be vulnerable to at least a 15-year interval storm.
- The bulkhead structure shall not result in loss to public access if applicable.
- The construction will not cause significant adverse impact.

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A bulkhead in a marina in Lake County Florida

Exemptions to the above criteria:

- If there are existing bulkheads on either side of a property and the gap between the bulkheads does not exceed 250 feet (coastal), then an authorization can be given to close the gap.
- If there is going to be a shoreline restoration project within nine months that has been permitted and funded, then the construction of a bulkhead cannot be authorized.

When is a permit not required?

A permit is not required for activities associated with the following types of exempt projects:

- Restoration of seawalls at their previous locations or upland of, or within one-foot water ward of, their previous locations. This paragraph does not affect the permitting requirements of Chapter 161.
- Construction of private seawalls in wetlands or other surface waters where such construction is between and adjoins at both ends existing seawalls; follows a continuous and uniform seawall construction line with the existing seawalls; is no more than 150 feet in length; and does not violate existing water quality standards, impede navigation, or affect flood control. This paragraph does not affect the permitting requirements of Chapter 161.

www.naplesdock.com

A bulkhead located in Naples, Florida.

Additional restrictions

Notice that there are additional restrictions placed on structures placed in **estuaries** and **lagoons** as cited in Chapter 373.414(5) F.S. as follows:

(a) It is the intent of the Legislature to protect estuaries and lagoons from the damage created by construction of vertical seawalls and to encourage construction of environmentally desirable shore protection systems such as riprap and gently sloping shorelines which are planted with suitable aquatic and wetland vegetation.

A bulkhead located in Tampa, Florida.

(b) No permit under this part to create a vertical seawall may be issued by the governing board or the department unless one of the following conditions exists:

1. The proposed construction is located within a port as defined in s. 315.02 or s. 403.021;

2. The proposed construction is necessary for the creation of a marina, the vertical seawalls are necessary to provide access to watercraft, or the proposed construction is necessary for public facilities;

3. The proposed construction is located within an existing man-made canal and the shoreline of such canal is currently occupied in whole or in part by vertical seawalls; or

4. The proposed construction is to be conducted by a public utility when such utility is acting in the performance of its obligation to provide service to the public.

(c) When considering an application for a permit to repair or replace an existing vertical seawall, the governing board or the department shall generally require such seawall to be faced with riprap material, or to be replaced entirely with riprap material unless a condition specified in paragraph (b) exists.

(d) This subsection shall in no way hinder any activity previously exempt or permitted or those activities permitted pursuant to Chapter 161.

This legislation is intended to discourage the placement of seawalls in areas where habitat loss can have significant impacts. Suggested alternatives include sloping riprap or native vegetation. If seawall repair is allowed, the permit may specify that the seawall be faced with riprap. No permit or exemption may violate state surface water quality standards and the Federal Clean Water Act provides the statutory basis for these standards. The above state statutes indicate that it is possible to get a permit and/or an exemption to construct a bulkhead. However, these are State of Florida regulations and it is also possible that local governments may have additional regulations. It is the property owner's responsibility to secure permitting at all levels.

How can I get information from the FDEP, from rules to literature?

There are several ways:

General to Specific Questions: Call the FDEP Office of Citizen Services at (850) 245-2118, or contact your local FDEP District Office.

For publications: Call the FDEP's Office of Environmental Education at (850) 245-2130, and ask for the Publications List.

Rules can be found on the FDEP web page under the "Index by Subject" drop down box.

Rules, Statutes and Publications also are available at the FDEP Library, first floor, FDEP Twin Towers Office Building, Tallahassee, (850) 245-8050.

Volunteer Bulletin Board

Good Bye Sky!

Dear Friends:

I am writing to say that I am pursuing another career path and leaving the *Florida LAKEWATCH* program at the end of July 2007. I will be going to work in private consulting where I will remain active in the field of environmental science. It has been my great pleasure to meet all of you, who as volunteer samplers are the key element to the continued success of the *Florida LAKEWATCH* program. The future outlook for the program is excellent and all of its employees are committed to serving your needs. For assistance in the interim time period while my position is being filled, please contact *LAKEWATCH* via the email address: fl-lakewatch@ufl.edu or using the toll-free phone number: 1-800-525-3928. Thank you again for your dedicated efforts; keep up the good work and I wish each of you success in the management of your waterbodies!

Best regards,

Sky Notestein
Florida LAKEWATCH Regional Coordinator

I know I speak for everyone when I say we will miss Sky and all of the talents he brought to the LAKEWATCH program and that we wish him well on his new career path. Good luck Sky!!!!

Mark Hoyer
Assistant Director Florida LAKEWATCH

New Regional Duties

Until a more permanent solution is determined, the remaining LAKEWATCH Coordinators will handle Sky's Region from the Panhandle down through Citrus County as follows:

Eric Schulz:
Gadsden, Liberty, Franklin, Leon, Wakulla,
Claude Brown:
Jefferson, Madison, Taylor, Dixie, Levy and Citrus Counties.
David Watson:
Escambia, Santa Rosa, Okaloosa, Walton, Holmes, Washington, Bay, Gulf, Calhoun, and Jackson Counties.
Dan Willis will take over the following counties from David Watson:
Orange, Brevard and Indian River.

We Need To Know!

If you are unable to sample your lake due to low water please let us know. You can call the toll free number
1-800-525-3928
or e-mail us at
fl-lakewatch@ufl.edu

2008 Florida LAKEWATCH Calendar Update

Work on the 2008 Florida LAKEWATCH calendar is progressing and we are excited about the more than 200 great photos we have received from our volunteers. For updates on the availability of the calendar and to see which photos have been included in the calendar check the LAKEWATCH website (http://lakewatch.ifas.ufl.edu) in late September or early October. Thanks to everyone who submitted entries and Good Luck!

Collection Center Changes

Jackson County

There are two new collection centers in Marianna:

1) Elder Care Services Marianna Office
4297 Liddon ST. Marianna, FL 32446
850-482-3220
Hours: 8 AM-12 Noon, Monday – Friday
Call ahead to be sure. It is next to the old high school.

2) Silver Lake Reality Offices
Jim Garrett Realty
132 Fairview Road
Marianna, FL 32448
850-579-4053
Contact: Beverly Schollian

Missing Your Quarterly Summary?

Florida LAKEWATCH head chemist Mary Stonecipher would like you to know that due to health reasons she has not been able to keep up with the quarterly data summaries, as she would like. She is doing much better now and is looking forward to getting your quarterly data summaries out to you as soon as possible. Thank you for your understanding!

Outstanding LAKEWATCH Volunteer

Some of Jerry Jaillet's fondest childhood experiences come from the shores of Lake Ola in Orange County. Even today he spends many hours of recreation on the lake working to protect it for others. Naturally, when Jerry learned about our organization he thought that it would be a great way to preserve this unique resource. Jerry was trained to collect water samples for LAKEWATCH on Lake Ola on October 7, 1990 and has remained a dedicated volunteer for over 16 years. During this time he has sampled for approximately 200 months. On top of this impressive achievement, Jerry also started sampling Lake Jem in Lake County on September 17, 1997. This is an extraordinary example of dedication and one that we can all find inspiration from. Way to go Jerry!

Lake Ola is a 446-acre lake located in the town of Tangerine at the corner of US 441 and Hwy 448. The lake is classified as a mesotrophic lake located in the Apopka Upland Region, an area of residual sand hills overlaying karst limestone bedrock. Lakes in this region are variable. Some are acidic, clear, soft water lakes with low mineral content and some are clear lakes with moderate nutrients and some are darker water lakes.

Jerry is an avid outdoorsmen, which makes a good match with a long career working in the nursery business. One thing we have learned about Jerry is that when a concern comes up on the lake, he will take the time to learn all about that issue before making a decision. Yes, we understand that lake management can lead to touchy debates, but keeping an open mind and getting the data to address the issues can lead to a better understanding of lake ecosystems and help make management decisions.

We give a heart-felt appreciation for Jerry's time and effort he has shared with the LAKWATCH program. Jerry' s dedication to his lakes goes well beyond anything we at LAKEWATCH expect and is a testament to his character.

We have greatly enjoyed all of his assistance and look forward to many more years of working with Jerry.

Florida LAKEWATCH

Jerry Jaillet displaying his Outstanding Volunteer paddle for more than 15 years dedication to the LAKEWATCH program at the Lake County regional meeting in Tavares.

A letter from Jerry:

As I grew up in Tangerine and spent many years on this nearly pristine lake, I recognized an opportunity to further my science studies to include limnology. As a professional foliage grower the swap to the aquatic environment from the terrestrial environment was just "same house, different room".

My LAKEWATCH career started at 12:00 pm on October 7, 1990 and I have been involved for 16 years, 7 months. I have no plans of stopping my activity but only of increasing it. My active involvement with this fine program has resulted in some of the most rewarding and intriguing years of my life. The education I have absorbed has been the most augmentative in my life.

I am looking forward to many more!

Jerry Jaillet
Ola / Orange
Jem / Lake

Ducks! Most people either love'em or hate'em.

Domesticated ducks are ducks that are bred in captivity and have been "tamed" from the wild. They are often raised as pets, for consumption, and for aesthetically pleasing purposes. Domesticated ducks often depend on humans for survival but can become quite adept at fending for themselves in the wild if need be. Common domesticated ducks observed on lakes include the Green-headed Mallard, White Peking, and the ubiquitous and often maligned Muscovy.

having domesticated ducks in your lake, there are also good reasons for not releasing our domesticated feathered friends into the wild.

Overpopulation

Let's face it, most people don't mind a few ducks in the lake. However, as you know it doesn't take long for a pair of ducklings to become a small family and before you know it there are flocks of ducks all over the lake! The problems

they happen to be at the time. Areas that we human beings like to frequent, such as swings, tables, chairs, water slides, benches, boats and docks are all favorite spots for ducks to leave there little calling cards.

Bacteria/Swimmers Itch

Some studies have shown that lakes and ponds with large populations of ducks and geese may also have high

Bob Paty

A mother Florida mottled duck with her ducklings in south central Florida in May 2006. Photograph copyrighted by Bob Paty, and used with permission.

Homeowners may intentionally release domesticated ducks on their lakefront property for numerous reasons. Some people like to see living things around their lake, some have memories of feeding the ducks when they were kids, and others just like having a few ducks hanging around for good measure. Just as these may be good reasons for

begin when the ducks start visiting places where they don't belong. They love swimming pools, backyards, docks, boats, driveways, roadsides, and just about anywhere you can imagine.

They also love to eat and have been known to chase people down to beg for snacks. Because they eat, they eventually have to defecate and will do so wherever

fecal coliform bacteria concentrations. These bacteria can cause and gastrointestinal distress in swimmers who ingest the contaminated water. Some people who are more sensitive can develop rashes when they come into contact with the bacteria.

Also associated with ducks and aquatic birds are certain parasites including the swimmer's itch organism that requires birds as intermediate host. When a duck defecates into the water it releases the parasites from its body, which then seek to find another host. One part of the life cycle of this parasite is a free-swimming form that attaches itself to swimmers and causes irritation that is known as swimmer's itch.

Nutrients

The waste produced by ducks contains both phosphorus and nitrogen. When their feces enter a water body it can elevate nutrient levels and cause higher algae concentrations. So if you have a large population of ducks on a small water body there is the potential for an increased chance of algae blooms when they defecate in or near the lake and in turn fertilize it.

www.copyright-free-pictures.org.uk

A green headed mallard pair floating in the lake.

Hybridization

The Florida Fish and Wildlife Conservation Commission (FFWCC) enforces a state law that prohibits the release of domestic ducks into the wild because these ducks can compete with native wildlife for food and habitat and may transmit diseases. Another potential problem with releasing domestic ducks also involves genetic issues. Domesticated Green-headed Mallard ducks can hybridize with the native Florida Mottled Duck and reduce their genetic integrity. There are documented cases where store-bought domestic Green-headed Mallard ducks were released into the wild. These ducks then bred with the native Florida Mottled Duck and created a hybrid that diluted the genetic pool of this unique species that occurs no where else in the world.

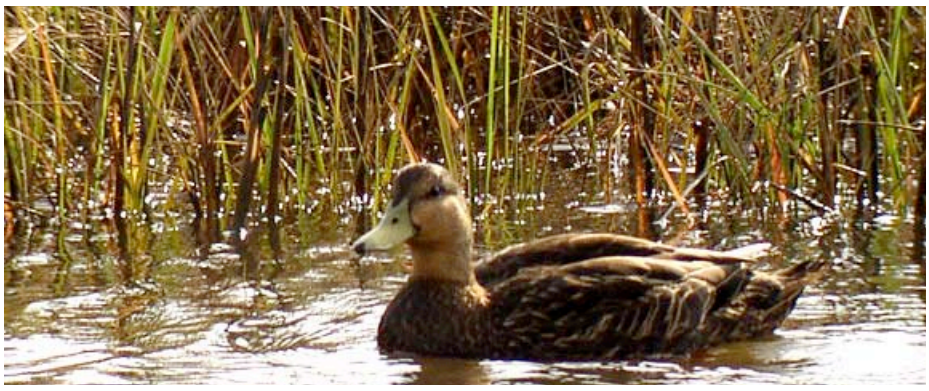
The Florida Mottled Duck does not migrate and spends all of its life in the peninsular area of Florida. Wild Green-headed Mallards, however, do not hybridize with the native Florida Mottled Ducks because by the time breeding season rolls around they will have migrated north, out of Florida, and therefore do not mate with the Florida natives. But the domesticated Green-headed Mallard ducks that are released to the wild do not migrate north and stay in Florida year round. As a result, they are available to breed and hybridize with the Florida Mottled Duck.

So what should one do? First off, do not release, feed, or shelter domesticated Green-headed Mallard ducks. Tell your friends and neighbors the problems associated with releasing or supporting domesticated mallards as well as other breeds of domesticated ducks. Educate your environmental managers about problems with these ducks. Get a commitment from the people who live on lakes or have lake access to not release them. All in all, the lakes will probably be better off with the native wildlife that normally uses the lakes.

If you would like additional information about the feral mallard hybridization problem or would like more information about the removal of mallards, please contact one of the FWC waterfowl offices at (850) 488-5878 or (321) 726-2862; or visit the FWC Web site at **www.MyFWC.com/duck** and click on "mallard control permit."

Licensed, permitted trappers may assist you with the removal of mallards. A list of trappers is available by visiting **www.MyFWC.com/trappers**.

The U.S. Department of Agriculture's Wildlife Services also has the authority and can assist you with such removal efforts. Their services are available year-round and they can be contacted at (352) 377-5556.



www.dep.state.fl.us

A Florida mottled duck in its native habitat.

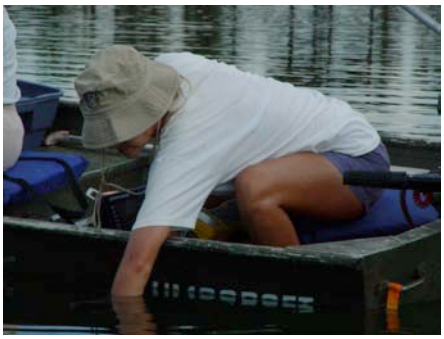
Why do We Collect the Brown Bottle Samples?

During training sessions, our volunteers may have noticed their regional coordinator collecting some additional water. These one-liter brown bottles are used by Florida LAKEWATCH to provide additional water for supplemental chemistry analysis. The additional testing for total alkalinity, pH, specific conductance, color and chloride concentrations provides insight into basic biological and chemical processes in lake systems. However, tests for these parameters must be completed in a shorter time window from un-frozen water, therefore they are only collected when the regional coordinator can turn them in quickly to the LAKEWATCH laboratory.

Total Alkalinity

Total alkalinity is a measure of the water's capacity to neutralize acids. Total alkalinity is often abbreviated TALK. The unit of measure for total alkalinity is milligrams per liter of total alkalinity as equivalent calcium carbonate (abbreviated mg/L as $CaCO_3$). Even though alkalinity is expressed in units that reference calcium carbonate, alkalinity levels of natural water are generally the result of bicarbonates.

Total alkalinity of a lake is influenced by the soils and bedrock minerals found in its watershed and by the amount of contact the water has had with them. For example, lakes in limestone regions, which are rich in calcium carbonate, often tend to have higher values for alkalinity. Those in sandy soil regions, which lack calcium carbonate, often tend to have lower values.



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LAKEWATCH staff collecting supplemental water samples from a lake in South Florida.

High alkalinity waters are more biologically productive than low alkalinity waters. Consequently, total alkalinity was once used as an indirect measure of a lake's productivity. In general, soft water lakes have lower alkalinity values ranging from 0 to 60 mg/L $CaCO_3$ and hard water lakes alkalinity values are greater than 62 mg/L as $CaCO_3$. Total alkalinity concentrations from 1120 Florida lakes sampled range from 0 to 391 mg/L as $CaCO_3$, with over 75% having total alkalinity values less than 42 mg/L as $CaCO_3$. This means the majority of lakes in the Florida LAKEWATCH program are considered soft water lakes.

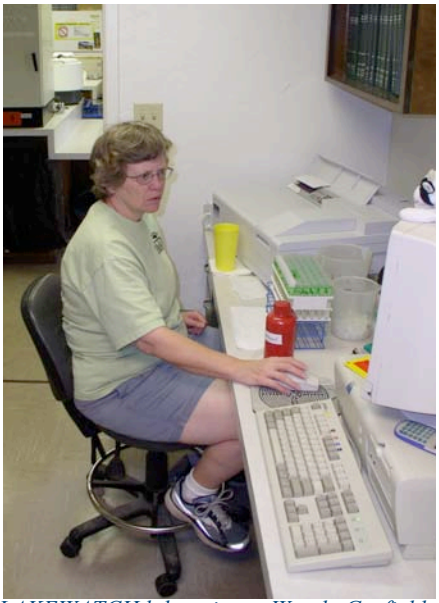
pH

The pH is a measure of hydrogen ions in solution. It is measured on a log scale of 1 (acid) through 14 (alkaline or basic), which means a change of one pH unit represents a tenfold change in hydrogen ion content. A measure of 7.0 is considered neutral. The pH of most natural waters ranges from 4.0 to 10.0 with most waterbodies falling in a narrower range of 6.5 to 8.5. For comparison, stomach acid has a pH around 2.0, human blood is around 7.0 and saliva around 7.5, while rainfall tends toward the acid side ranging from 4.5 to 5.7.

The pH of hard water lakes is generally stable due to the high amount of bicarbonate in the water. The pH values of these lakes range vary over a narrow range from 7.5 to 8.5. The pH of soft water lakes by comparison is much more variable ranging from 5.0 to over 9.0 due to lower concentrations of bicarbonate ions in the water. Photosynthesis and respiration are the driving forces for the change in pH over the course of a day in lake water. Photosynthesis removes CO_2, which is acidic, from the water leading to an increase in pH. Respiration dominates during the night when there is no photosynthesis leading to increases in CO_2 and a corresponding decrease in pH. The pH values from 1120 Florida lakes sampled ranged from 3.9 to 11.7, with approximately 50% of the lakes sampled having pH values between 5.8 to 7.8.

Specific conductance

Specific conductance is a measure of the capacity of water to conduct an electric current and is representative of the total amount of ions or salts in the water. A higher value of conductance means that the water is a better electrical conductor. Generally, specific conductance of a lake is determined by the geology of the land surrounding the lake.



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LAKEWATCH lab assistant Wanda Garfield analyzes water samples.

Conductivity can become elevated as a result of human activities. For example, effluent from septic systems or wastewater treatment plants can have high solute levels that raise the

specific conductance above natural levels. Natural factors can also cause higher conductance values in the open water. For example, drought conditions can increase the salt concentrations in a lake as the heat and low humidity can increase the rate of evaporation in open water, leaving the lake with a higher concentration of salt.

Specific conductance values of 1120 lakes sampled in Florida ranged from 11 to 20233 µS/cm @ 25° C with over 75% of the values less than 220 µS/cm @ 25° C.

Color

Color of a water sample is comprised of two components. **Apparent color** is the color of a water sample that has not had particulates filtered out and **true color** is the color of a water sample that has all particulates filtered out of the water.

The measurement of true color is the one most commonly used by scientists and the value reported by LAKEWATCH. Color is expressed in **platinum-cobalt units** (abbreviated as either **PCU** or **Pt-Co units**) and a higher PCU value represents water that is darker in color.

The presence of color can reduce both the quantity and quality of light penetrating into the water column and in turn, will influence the growth of plants and algae, the types of aquatic plants and the depth they will grow to. An acceptable level of color depends on personal preference. Water clarity becomes noticeably reduced in highly colored waters (greater than 50 PCU) to the point where underwater hazards may be concealed, creating a potentially dangerous situation for swimmers, skiers, and boaters. The color values of 1120 lakes sampled in Florida were highly variable and ranged from 0 to 700 PCU with 75% of the color values less than 68 PCU.

Chloride Concentration

Chloride is a substance found in all natural waters. Chloride levels in lakes are affected by several factors with climate being a major influence. For example, chloride concentrations in lakes in humid regions tend to be low, whereas those in semi-arid and arid regions may be hundreds of times higher because of higher rates of evaporation.

The activities of people and animals can also affect chloride concentrations. Common table salt, sodium chloride, is a necessary part of human and animal diets. Chloride is found in all animal and human wastes, septic systems and areas where animal wastes are deposited and can be sources of chlorides entering lakes. Home water softening systems and fertilizers are also potential sources of chlorides. For these reasons, the presence of high levels of chlorides can sometimes be used as an indicator of pollution from these sources.

Many coastal waters have high concentrations of chloride, because they are close to marine (i.e., saltwater) systems. In these waterbodies, seawater can seep underground, called saltwater intrusion, or flow directly into them through tidal flow. Also, sea spray carries chloride into the air where it can then enter lakes as part of rainfall, even far from coastal areas. Chlorides are not dangerous themselves, but may signal the possibility of contamination from human or animal wastes that contain bacteria and other substances of health concerns. For this reason, it is important to investigate sources of high chloride concentrations in inland waters. The chloride concentrations of 1120 lakes sampled in Florida range from 1.7 to 7500 mg/L, with over 75% of the lakes having chloride concentrations less than 28 mg/L.

As you can see, a great deal of insight into a waterbodies condition can be determined from the results of this supplemental water chemistry.

Amy Richard

LAKEWATCH head chemist Mary Stonecipher pours up water for chemical analysis.

For additional information please refer to Florida LAKEWATCH Circular 101,

A Beginner's Guide to Water Management: A Description of Commonly Used Terms.

Department of Fisheries and Aquatic Sciences
Florida LAKEWATCH
7922 NW 71st Street
Gainesville, FL 32653

Florida
LAKEWATCH

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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.

Fundraiser Update!

The vision for a new LAKEWATCH HOME is an exciting prospect. To date we have raised approximately $40,000. We have received donations from individual LAKEWATCHers, lake homeowner associations and private consulting firms. We thank all who have donated. This is a good start, but as you can see lots of hard work remains to be accomplished! Our goal is very reachable if we all work together. If you are interested in participating in the fundraising campaign, please contact us at 1-800-525-3928. New ideas and approaches are welcome!