Florida
LAKEWATCH

Dedicated to Sharing Information About Water Management and the Florida LAKEWATCH Program Volume XXXVIII 2007

Will Strong

Ginnie Springs located in Gilchrist County, Florida.

Spring Time Is Here!

Floridians walk on water

Florida's karst geology is the primary reason it has so many springs. The term karst refers to land forms that have been modified by dissolution of soluble rock such as limestone. Most of the springs occur in the northern two-thirds of the peninsula and the central panhandle. These areas have features such as sinkholes, caves, and limestone geology.

There are three major aquifer systems recognized in Florida, The Floridan, the Intermediate and the Surficial Aquifer Systems (Southeastern Geological Society, 1986). The term aquifer represents a body of soil, sediment, or rock that is saturated with water and sufficiently permeable to allow pumping of water from wells. The vast majority of Florida's springs result from discharge from the Floridan aquifer.

The Floridan aquifer has a high potential energy that is available to move the ground water in a confined aquifer. This allows ground water to flow to the surface of low ground elevations resulting in springs.

Rainwater is made slightly acidic by combining with carbon dioxide from the atmosphere and organic acids in the soil. As a result, this acidified water dissolves portions of the permeable limestone sediments within the aquifer. Because of this chemical

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Springtime is Here! (continued from page 1)

reaction with the carbonates of the limestone sediments, the water chemistry of springs generally remains stable over extended periods of time.

The flow rates of springs are dependent on the rate of recharge, which is a function of fluctuations in rainfall. Spring water may be from recent rainfall or from water residing underground for quite some time. Research suggests that waters flowing from larger springs have an average ground-water residence time of more than 20 years (Katz, 2004). From 1998-2002, Florida experienced a drought, which led to a significant reduction in flow in many first magnitude springs probably a result of reduced recharge.

Upwelling of Concern

A spring recharge basin or "springshed" consists of "those areas within ground-water and surface-water basins that contribute to the recharge of the spring" (DeHan, 2002; Copeland, 2003). Since karst topography features sinkholes that can transmit surface water directly to the aquifer, a spring's recharge basin may include surface-waters that originate from outside the ground-water basin.

The volume and chemical composition of waters that discharge from springs is a function of the geology, hydrology, and land uses within each spring's recharge basin. Recently, increased awareness of groundwater changes such as increasing nitrates has lead to studies of the drainage basins that supply water to springs.

In 1999, a multi-agency Florida Springs Task Force (2000) was initiated by the Florida Department of Environmental Protection (FDEP) to evaluate physical and chemical trends in Florida springs.

The task force research found steady increases of nitrates in 13 first-magnitude springs between the 1970s and the early 2000s (Jones et al., 1996; Champion and DeWitt, 2000; Means et al., 2003). Over 40% of the Florida springs that were sampled had a ten-fold increase in nitrate concentrations above normal groundwater concentrations while almost 25% had concentrations that were 20 times higher than normal.

Springing into action

While the cause and potential impacts to spring ecology of increased nitrates are not fully understood, the FDEP is aware of the nitrate issues. They are working with other agencies to reduce nitrate contamination in the areas where many of Florida's springs are located. For example, agencies are delineating springsheds and storm water receiving areas as well as identifying land uses that may contribute nitrates into the ground-water systems. Continued monitoring of the springs, spring runs, and ground-water basins are important steps in protecting Florida springs.

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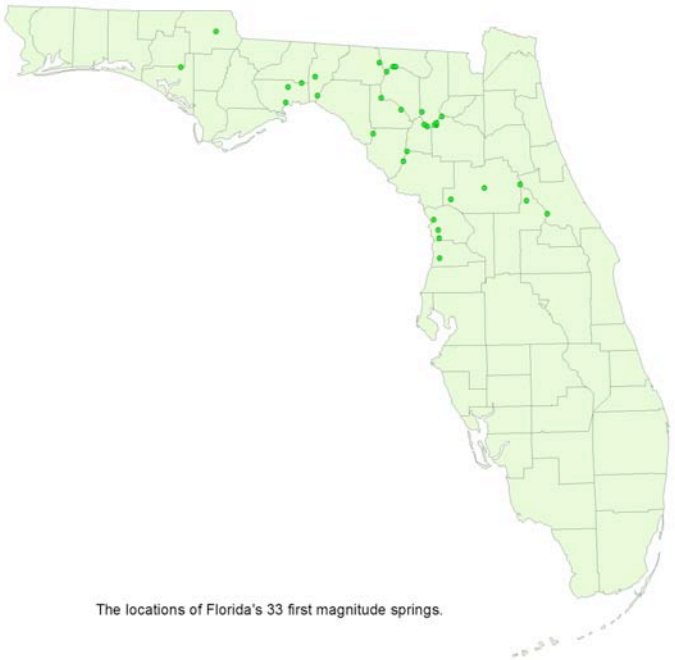

The locations of Florida's 33 first magnitude springs.

Seagrasses: Florida's Aquatic Meadows

Florida's Seagrasses

When you hear the word meadow used to describe a habitat, you might picture an open area with lush green grass. This same description could be used to describe a *seagrass meadow*, except that you need to include being underwater in the later image. Worldwide there are approximately 60 seagrass species and Florida has seven different seagrass species as well as immense coastal meadows. If you're a saltwater angler you know seagrass meadows for the many fish that can be caught there.

What are Seagrasses?

Seagrasses are true plants which evolved from land plants to colonize the marine environment. Unlike large algae, some of which at first appear plant-like, seagrasses are *angiosperms*, meaning they are capable of flowering and producing seed and also have true roots, stems and leaves which are made up of vascular tissue. Don't plan on gathering an arrangement of seagrass flowers though; the flowers are tiny and inconspicuous. As many plants do, seagrasses also grow through vegetative means by expanding their underground runners which branch from an established plant. Called *clones* by seagrass researchers, large areas can be made up of only several distinct plants.

Florida's Seagrass Species:

Turtle Grass (*Thalassia testudinum*)
Manatee Grass (*Syringodium filiforme*)
Shoal Grass (*Halodule wrightii*)
Johnson's Seagrass (*Halophila johnsonii*)
Paddle Grass (*Halophila decipiens*)
Star Grass (*Halophila engelmanni*)
Widgeon Grass* (*Ruppia maritima*)

Where are they found in Florida?

In coastal environments where conditions are right, seagrass meadows can range from patchy, rug sized collections to expanses of hundreds or even thousands of acres. Collectively these seagrass meadows add up to some impressive numbers. The Florida Fish and Wildlife Conservation Commission estimates that there are 2 million acres of seagrass in Florida waters of the Gulf of Mexico and Florida Bay (over 1 million acres in Florida Bay alone). Some 700,000 acres of seagrass exist in the east coast waters of the state from the middle of Mosquito Lagoon to the lower portion of Biscayne Bay. In addition, Florida has an estimated 1 million acres of seasonal seagrass in deeper coastal marine waters.

Florida Oceanographic Online

Turtle Grass (Thalassia testudinum) is the largest and most robust seagrass in Florida and the Caribbean.

Importance of Seagrass

These meadows serve several important ecological roles, including:
1) Seagrass meadows are very productive, making them important links in marine food webs. Estimates of their productivity suggest the ability to fix carbon dioxide (CO_2) into new plant tissue at twice the rate achieved by some cultivated crops, like corn or rice. Some researchers have estimated that seagrasses can produce more than 800 grams of carbon per square meter per year. 2) Seagrass meadows provide food or shelter for numerous of marine organisms including invertebrates, fish, waterfowl, sea turtles and manatees. It has been estimated that 85% of the commercially and recreationally important marine fisheries in Florida (*e.g.* spotted sea trout, red fish, gag grouper, blue crabs, shrimp and bay scallops) utilize seagrass habitat for at least one part of their life stage.
3) Seagrass meadows may reduce coastal erosion by binding sediments with belowground root and rhizome systems and by reducing wave energy or the speed of currents with aboveground leaf material. Seagrass meadows, along with salt marshes and mangrove forests, vegetation zones, which can moderate the impacts of wind, waves and tidal surge.

Threats to Seagrasses

Factors that affect the distribution of seagrass meadows include both normal variations of weather and periodic storm events, as well as direct and indirect human causes. Naturally occurring events such as storms and hurricanes have the ability to shift coastal sediments, which can bury seagrass meadows or erode the sediments they grow on. Events like these, do not necessarily eliminate seagrasses, but can certainly modify their distribution. Because the discharge of rivers and estuaries is related to the rainfall patterns in their watersheds, it is likely that seagrass distribution patterns will vary in response as well. For example, the volume of fresh water supplied to coastal areas via river discharge has a direct influence on salinity levels, which in turn influence seagrass species and abundance. Additionally if tannins or other forms of dissolved organic matter are present in the river,

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*some do not consider this a seagrass; it is commonly associated with estuarine habitats.

Volunteer Bulletin Board

Florida LAKEWATCH Photography Contest for a Calendar

Florida LAKEWATCH is looking for photographs to be used in their first calendar (2008). Florida LAKEWATCH volunteers must take the photographs and the content of the photographs must be about the lake they sample. The categories for this year's calendar are: aesthetics, flora & fauna, and recreation. Florida LAKEWATCH staff will be Judges and the twelve winning photographs will be featured in the 2008 calendar.

Florida LAKEWATCH Cookbook

Florida LAKEWATCH is also collecting recipes from interested volunteers to be used in a Florida LAKEWATCH cookbook. Gather all of those special recipes that have been passed down through your families and lets make a great cookbook.

Secure the Future- A Home for LAKEWATCH

When completed both the calendar and cookbook will be distributed for donations that will be used for building a much needed, new home for the Florida LAKEWATCH program.

Send as many photographs and recipes as you want via snail mail to:

Florida LAKEWATCH
Department of Fisheries and Aquatic Sciences
7922 NW 71st Street
Gainesville, FL 32653-3071

Or E-mail electronic copies to:

fl-lakewatch@ufl.edu

Mark Your Calendars Now!

Florida LAKEWATCH Invites You to a Volunteer Appreciation Picnic

Activities include a tour of the LAKEWATCH facilities and meeting with other volunteers across the state to discuss lake issues and a home for LAKEWATCH.

When: Saturday, August 18, 2007

Time: 12:00 Noon
Where: The Fisheries Department at the University of Florida in Gainesville.

Barbecue, fish and drinks will be provided by LAKEWATCH. Please bring a side dish to share.

Please RSVP by August 10th at
1-800-525-3928 or fl-lakewatch@ufl.edu

Collection Center Changes

Orange County

The IFAS Extension Office in Orlando is now in its new building located at:
6021 South Conway Road
Orlando, FL 32812
New phone number:
407-254-9200.

Marion/Lake County

The Collection Center in Altoona has moved six miles North on Hwy 19 to the US Forestry Services fire dispatch office, which is next to the Ocala 4-H camp right off of Hwy 19.

Florida LAKEWATCH has a new e-mail address:

fl-lakewatch@ufl.edu

Want to Get Your Newsletter Electronically?

Due to the many requests by LAKEWATCH volunteers, we are now offering our newsletters electronically. If you would like to receive the LAKEWATCH newsletter via the internet, and you have not previously notified us, please send us an e-mail using our new e-mail address to request the electronic version instead of a hard copy.

Outstanding LAKEWATCH Volunteer

Maurice Logan talks with Florida LAKEWATCH Regional Coordinator Dan Willis at the 2005 Polk County Regional Meeting in Bartow.

Maurice Logan has lived on Lake Blue for 40 years and has been the LAKEWATCH sampler on his lake for 15 years. Sandy Fisher (retired LAKEWATCH director) trained Maurice on February 13, 1991 and he has collected approximately 147 months worth of samples to date.

Lake Blue (North Basin) is located at the intersection of Hwy 27 and Hwy 640 in Polk County. The lake is located in the Northern Lake Wales Ridge Region and is oligotrophic (nutrient poor with clear water).

In addition to collecting water chemistry data for LAKEWATCH, Maurice also collected lake level and rainfall data for the Southwest Florida Water Management District. During the forty years he has lived on the lake he has witnessed a 16 foot fluctuation in lake levels, three hurricanes, and yearly rainfall data that have ranged from as low as 30.7 inches in 1984 to as high as 76 inches in 2005 with a yearly average of 53 inches.

Maurice turned 91 years old in March 2007 and has decided to move off the lake after many years of enjoyment and dedicated service. Some fond memories he recounts are: watching the birth of approximately 200 wood ducks since he installed his wood duck houses, watching snail kites through out the years feeding on apple snails while perched on his gazebo and sharing his backyard with Sand Hill Cranes.

The pleasure of having Maurice as a volunteer is all ours because we do not come across volunteers like Maurice very often. His dedication to Lake Blue and LAKEWATCH goes beyond anything we could have hoped for from a volunteer. We wish the best for him and his family and offer our dearest gratitude for his contribution. Maurice's efforts will help Lake Blue for years to come and hopefully someone will volunteer to carry on his legacy.

Seagrasses: Florida's Aquatic Meadows (continued from page 3)

water, the resulting dark-colored waters will strongly absorb light. For these reasons, coastal rivers and associated estuaries often lack seagrasses due to unfavorable salinity ranges or insufficient sunlight.

Human activity can have both direct and indirect impacts upon seagrasses. Direct impacts include: 1) "Seagrasses scaring" caused by propeller damage from operating boats in shallow waters. In heavily trafficked areas, the cumulative propeller damage can eliminate seagrasses from large areas. 2) The use of bottom nets in commercial fisheries can also cause considerable damage and reduction of seagrasses. 3) Dredging and filling for construction and for navigation channels can result in direct loss of seagrass habitat as well.

Human activity can also indirectly impact seagrass meadows: 1) Just as lakes and rivers can be susceptible to eutrophication, so too can coastal waters. One possible outcome of coastal eutrophication is that less sunlight would be available for the seagrass photosynthesis. This can result from the scenario of increased nutrient loads being delivered to coastal waters, allowing phytoplankton and *epiphytes* (the microscopic community that include algae which grow on the surface of underwater plants) to increase in abundance to the point that the ambient sunlight is not enough to meet the metabolic needs of seagrasses.

Florida Oceanographic Online

Shoal grass (Halodule wrightii) is an extremely important seagrass. It is a colonizer of disturbed area where turtle grass and manatee grass cannot grow.

Seagrass loss due to light attenuation usually begins along the deeper edges of the beds, where the light reaching the plants is naturally lower and progresses towards the shallows as light availability declines. 2) Another eutrophication related factor could include the shading by macroalgae; both filamentous forms and drift algae (think aquatic tumbleweeds). 3) Erosion along coastal rivers and the subsequent delivery of the suspended particulates can dramatically reduce light availability as well, again resulting in declining seagrass abundance near coastal river mouths.

Seagrass Protection

Seagrass protection and preservation are integral parts of most estuarine management plans and government regulations exist for their protection. You can stop damage to seagrass (and very likely your boat!) by avoiding areas shallower than your vessel and motors' draft. Utilize navigation channels where possible and request improvements to the existing network of marine navigation channel markers if needed. More difficult to address are the combined effects of coastal development, habitat modification and eutrophication. Issues of this scale require the shared efforts of both citizens and governments, through best management practices, conservation, comprehensive planning and zoning. Next time you are enjoying our coastal resources, take a moment to look for seagrass meadows.

Florida Oceanographic Online

Manatee grass is the second most abundant seagrass in Florida.

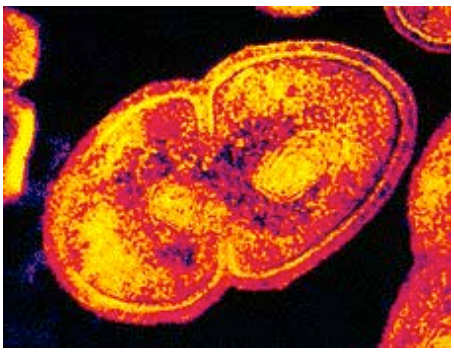
Bacteria in Water Bodies: A Concern for Citizens?

After years of working with Florida LAKEWATCH volunteers, we've found that bacterial contamination is a major concern among citizens. Fortunately, advances in the treatment of human waste have greatly reduced the incidence of diseases resulting from contaminated water. Widespread development has been accompanied by a dramatic increase in the number of septic tanks and/or municipal sewage treatment plants. As a result, concerns about bacterial contamination are re-emerging among citizens and some scientists.

Life itself is not without risk and it is impossible to guarantee with 100% confidence that an individual will not become ill upon contact with water. However, bacterial contamination of water is much less of a problem than it used to be. Rather than being fearful, citizens are encouraged to remain vigilant and solve problems as they emerge. Once the public has been warned about possible contamination, correcting the problem should be the most important management objective and this includes being committed to tracking down the source of the bacterial contamination.

Bacteria in Aquatic Systems

Bacteria are a natural component of life in all aquatic systems including freshwater lakes, rivers, streams and oceans. They serve as "decomposers" of dead plant and animal tissues and continually recycle nutrients back into the water. Like most things in life, it only takes a few troublemakers to spoil the fun. Health officials are mostly concerned about a few bacteria strains that are associated with the intestines of warm-blooded animals, including humans, as well as certain opportunistic viruses and protozoa that can cause illness in people, particularly those with weakened immune systems.



Fecal coloform bacteria are one of the "troublemakers' that causes concern among heath officials.

Bacterial contamination refers to instances in which bacteria associated with human or animal wastes are found in concentrations greater than the receiving waters can handle. Humans drinking from, swimming in, or eating shellfish from such a contaminated water body run a risk of being exposed to harmful bacteria or pathogenic viruses. Because it is impossible to eliminate all harmful bacteria from aquatic environments, health agencies have set standards for acceptable levels allowed in public waters.

These standards tend to be conservative and are effective in preventing human health problems nearly all of the time. However, even if risk levels may be deemed acceptable, meeting the standards does not completely eliminate the possibility of becoming sick. Along the same lines, just because a bacterium enters a water body, it doesn't necessarily mean the risk of contracting a disease is increased. It simply means that there is the potential for a problem. In a study of 99 Florida lakes from 2000 to 2003, scientist from the University of Florida found that only 2% of the lakes sampled were above the state standards.

Potential sources of bacterial contamination in Florida water bodies can be grouped into three general categories: human waste, domestic animal waste, and naturally occurring wastes from wildlife. Of course, contamination can also result from a combination of sources.

Human Waste

When financial resources are available, municipal wastewater treatment plants are used to treat large volumes of human waste. While these treatment plants are extremely effective at removing disease-causing bacteria from wastewater discharges, there is still a possibility that pathogens could be present in water discharged from these treatment plants. In rural and suburban areas of Florida, septic tanks are the most common treatment systems used for human waste. Septic tanks are often maligned when issues of nutrient enrichment and bacterial contamination are discussed among lake users. This is unfortunate because, while there is certainly evidence that septic tanks can add nutrients and bacteria to lakes, their contribution is usually not as great as many people believe.

Domestic Animal Waste

Most domesticated animals are warm-blooded and their wastes also harbor pathogens known to adversely affect humans. Unmanaged storm-water runoff from sites with high concentrations of domesticated animals such as cattle feedlots, pig farms, and chicken farms can be a potential source for bacterial contamination. Given the high visibility of these facilities and the odors they tend to emit, residents tend to blame these sites when bacterial contamination issues arise. However, such operations are not always to blame and bacterial testing must be conducted before any conclusions are made.

Waterfowl can be a source of bacterial contamination in lakes.

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Florida
LAKEWATCH

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Bacteria in Water Bodies: A Concern for Citizens? (continued from page 7)

Domesticated animals living on open pastureland, such as cattle or horses, can also contribute to high bacteria counts in water bodies. Contamination is often related to animals entering the water for drinking or cooling purposes and then defecating directly into the water. This can be corrected relatively easily by fencing the animals away from the water. However, the animals will then need to be provided drinking and cooling water, which can be expensive.

Naturally Occurring Waste from Wildlife

There are naturally occurring sources of bacteria. For example, large concentrations of wildlife such as deer, wild hogs, or birds represent significant potential sources for bacterial contamination of water.

When Lake Fairview in Orlando, Florida was found to have high bacteria counts, it was originally thought that the source was leaky septic tanks. This resulted in discussions concerning the need for a municipal water treatment plant. However, after an extensive bacterial survey, it was determined that fecal waste from a large number of seagulls using the lake was the source of contamination. An observant biologist noticed that when the seagulls were absent, there was no contamination. In this instance, eliminating septic tanks would not have solved the problem because it was a phenomenon of nature that was difficult to control.

Remember prudence should always be exercised when it comes to human health. If you have been swimming in a water body and become ill, see your doctor and tell her/him that you have been in contact with recreational waters. The probability that your illness is related to a waterborne disease is low, but if it is, then most illnesses can be treated quickly and effectively once diagnosed. Should you have any questions or concerns regarding bacterial contamination in your water body, please call Florida LAKEWATCH: 1-800-LAKEWATCH (1-800-525-3928).