

Florida LAKEWATCH



Dedicated to Sharing Information About Water Management and the Florida LAKEWATCH Program Volume 48 (2010)

Market Surpasses 10,000!

Florida like so many states is experiencing financial difficulty, but it is the individual citizens who are feeling the greatest pain during the recession. For some talking heads, the only barometer that will be linked to people feeling better is when the stock market passes the 10,000 mark!

Well back to lakes. LAKEWATCH's volunteers, Florida's citizen scientists, helped the program pass another 10,000 milestone. LAKEWATCH now has a database of 10,755 lake-years of data on phosphorus, nitrogen and chlorophyll for 1312 Florida lakes. Over two hundred lakes have been sampled for over 15 years with some individual lakes approaching the 25-year mark!

This size of this database is unprecedented in the United



Florida's citizen scientist, like these in Highlands County, helped LAKEWATCH develop a database of 10,755 lake years of data.

Florida LAKEWATCH

States (probably the world) and is a true tribute to the hard work and dedication of our citizen scientists. But, the Florida LAKEWATCH story becomes even more impressive when we remember that the Florida Legislature established the Florida LAKEWATCH program (Chapter 1004.49 F.S.) in 1991 to provide general background and scope of the information on Florida lakes and to establish

trends in lake water quality.

Since 1991, monthly samples for nutrients (total phosphorus and total nitrogen), algal biomass (chlorophyll) and water clarity (Secchi disc) have been collected for a group of 44 lakes from 1991 to 2009 (The LAKEWATCH 44). Additionally a group of 100 lakes have been sampled monthly from 1995 to 2009 (The LAKEWATCH 100).

These two datasets now represent the most robust compilation of quantitative water quality data available in Florida for assessing water quality trends over time.

So, first let us discuss the good news. The State of Florida's Department of Environmental



Protection is working to establish a “status and trend monitoring” network of Florida waters because of concerns about the impact of nutrient enrichment. The LAKEWATCH 44 index and the LAKEWATCH 100 index permit us to assess water quality trends in Florida right now. Using the LAKEWATCH indices, which incorporate the same lakes sampled over the same time period for each index, there are no significant differences in nutrients (total phosphorus and total nitrogen), chlorophyll and water clarity for our Florida lakes (as a group) since the 1990s!

Seeing no major increasing in nutrients and algal biomass among Florida lakes as a group over a long time period (also a period of rapid growth) is comforting, but most Floridians and certainly LAKEWATCH’s

Citizen Scientists do not particularly care about the “status” of Florida waters; rather they care about the lake with the most common name in Florida and elsewhere – **MY LAKE**.

Examining water quality trends over time in the LAKEWATCH lakes (200 lakes) with 15 or more years of data shows total phosphorus and total nitrogen concentrations decreased in 13% and 11% of the lakes, respectively. Chlorophyll decreased in 15% of the lakes and water clarity increased in 10% of the lakes. On the other hand, total phosphorus and total nitrogen concentrations increased in 36% and 41% of the lakes, respectively. Chlorophyll increased in 22% of the lakes and water clarity decreased in 35% of the lakes. Given that 59% to 78%

of the lakes (depending on the water quality parameter of interest) had either improvements or showed no change, it is again suggestive that the nutrient enrichment issue may not be as severe as once thought.

With fewer lakes showing increases in nutrients, the task of ascertaining what is happening at each lake becomes more manageable. For example, Little Lake Santa Fe is an “*Outstanding Florida Water*” and had low phosphorus concentrations until recently (Figure1). The rapid rise in the total phosphorus concentration was due to a natural 9000-acre forest fire in the adjacent Santa Fe swamp. The fire got into the ground and burned the “muck” so the increase in in-lake phosphorus concentrations was due to a

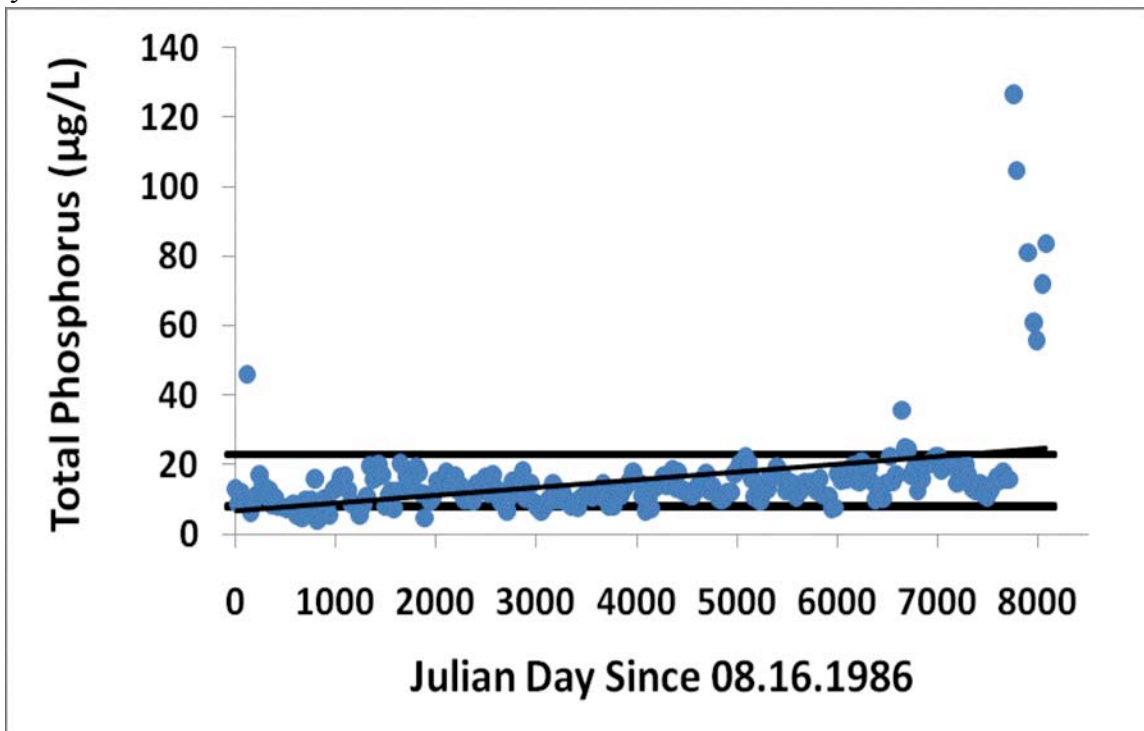


Figure 1. Total phosphorus concentrations in Lake Little Santa Fe over time since August 16, 1986, the first date that Little Santa Fe was sampled for the LAKEWATCH program.

natural event, not a human activity!

Nutrient enrichment should always be a concern for individuals interested in lakes, but proper lake management requires that all the issues of concern be placed on the table and prioritized. For far too long the professional community has expressed the belief that the most important elements in lake management were the control of phosphorus and nitrogen, but the most important elements are the control of silver and gold – money!



A. Goebels

Storm water runoff in a ditch draining to Cub lake in Seminole County.



Mechanical harvesting of an aquatic “weed” problem in Lake County.

Florida LAKEWATCH

Available dollars need to be directed to solving the concerns of the citizens. In some cases, it may be the lack of aquatic vegetation or too much vegetation (an aquatic weed problem). Or, it could be storm-water bringing too much sediment causing a lake to become too shallow for boating. Dredging could be needed. It could also be a fish and wildlife management problem, but regardless of the issue each lake will ultimately need an individual management plan to insure the long-term usability of the lake for our citizens.

Nutrient enrichment should always be a concern for individuals interested in lakes, but proper lake management requires that all the issues of concern be placed on the table and prioritized.

Florida Fisheries Habitat

By Bob Wattendorf of the Florida Wildlife Conservation Commission

Florida's freshwater anglers are truly blessed with 7,700 lakes greater than 10 acres, covering 3 million total acres, and approximately 12,000 miles of fishable rivers, streams and canals. That is a lot of diverse habitat for more than 200 species of native freshwater fishes, plus more than 23 species of nonnative fishes that reproduce in our waters. Relatively little of that habitat could qualify as pristine, although most of it provides for quality fishing opportunities. There are a few topical concerns facing Florida that could impact fishing in the state.

Recent news articles from the U.S. Geological Survey (USGS) reported widespread mercury contamination in fish nationwide. This is an issue the Florida departments of Health, Environmental Protection and Agriculture and Consumer Services along with the Florida Fish and Wildlife Conservation Commission (FWC) have been carefully monitoring. Together these agencies are reminding Floridians that eating fish is an important part of a healthy diet and that active outdoor recreation such as fishing and boating can be an important key to a happier, healthier lifestyle.

Eating a variety of fish provides an excellent source of nutrition. For most people, fish caught in Florida do not pose a significant health concern with regard to mercury; however, it is advisable for women of child-



Florida Wildlife Conservation Commission

Good fisheries habitat typically includes uncontaminated water, clean firm lake bottoms and a diversity of native aquatic plants.

bearing age and young children to select fish that are low in mercury.

Another USGS release announced that effluent from women's birth control pills has affected fishes — creating a feminizing effect caused by these hormones. However, research is also looking at the affect of other chemical stressors that aren't directly related to hormones, such as pesticides, heavy metals and cleaning compounds. Nationally, 44 percent of male black bass tested had egg cells growing in them, and the affect was found in six of the nine rivers tested nationally. The only river tested in the USGS study from Florida was the Apalachicola where 60 percent of bass from near Blountstown were intersex. Although, the FWC has done some background sampling and work with the University of Florida to further expose the problem in the Sunshine State

much work remains to determine how this issue will impact fish populations and what can be done to safeguard them and the public.

Summer fish kills have always been common in Florida, and it is important to note that these are consistently associated with low dissolved oxygen levels in the water and not typically with pollutants. These historic and natural kills are related to some simple physical and biological facts.

First, warm water can hold less dissolved oxygen than cold water. Second, fish and other animals need dissolved oxygen to live, and when they pass it through their gills, they remove oxygen—for that matter so do other animals, including bacteria that live in the water. Third, plants in the water on sunny days create oxygen, but they use oxygen at night or on cloudy days. A little oxygen is also dissolved into the water at the

interface with the atmosphere. So what happens when you get few hot rainy days? Put it all together, and the warm water has less oxygen to start with, and rains sweep debris (such as grass clippings and leaves) into the water. Helpful bacteria start growing and reproducing to break down the debris and start using up lots of oxygen. With overcast skies, the plants in the water can't produce oxygen and have to use it, so before long there isn't enough oxygen to go around. If this occurs slowly, fish can often move out of the low oxygen areas until it is safe to return; but if it happens suddenly, and they are trapped, many die.

All of these recently reported issues point to the reason that environmental and health agencies need to continue to work together. The National Fish

Habitat Conservation Act is a comprehensive strategy to allocate conservation dollars for effective restoration of our national waterways and is working its way through Congress.

The act, if passed, will improve how the U.S. Fish and Wildlife Service approaches fish habitat conservation. With 40 percent of the U.S. fish populations in decline and half of our waters impaired, this bill encourages collaborative regional conservation efforts that bring together federal government agencies, state and local governments, conservation groups, fishing industry groups, and businesses. The bill is being supported by the Nature Conservancy, American Sportfishing Association and other partners. You can learn

more at FishHabitat.org.

Your FWC isn't waiting for the National Fish Habitat Conservation Act; we're already working with other state, federal, local and private partners to ensure a safe and sustainable future for Florida's freshwater fisheries. In addition, the FWC has an active Aquatic Habitat Resource Enhancement section. However, you and groups like the Florida Freshwater Fishing Coalition (FLFFC.org) and others can play a vital role in ensuring that the public understands the importance of healthy aquatic resources and the challenges facing us. Some of those challenges have been around since before the Seminoles; others are a product of our technology and growth, but working together they are all manageable.



Florida Wildlife Conservation Commission

Dewey Andrews a long-time Florida angler has enjoyed Florida's fisheries resources for decades.

Additional information about fish consumption advisories and fact sheets can be found at <http://doh.state.fl.us/floridafishadvice/>

A Weekend in My Watershed

**Saturday, June 12 and
Sunday, June 13, 2010**
Plantation Inn,
Crystal River, Florida

Sponsored by:

Florida Lake Management Society
Southwest Florida Water Management District
Dredging & Marine Consultants
A Crystal River Kayak Company, Inc.



A Weekend in My Watershed Schedule June, 12-13, 2010

DAY ONE (June 12) Activity

Activity	Time Period	Where
Welcome to the Weekend	3:00 to 4:00 p.m.	Plantation Inn
Workshop 1: Introduction to Weekend	4:15 to 5:45 p.m.	Plantation Inn
Dinner: Florida Fish Fry	5:45 to 7:00 p.m.	Plantation Inn
Workshop 2: Plant Function and Identification Activity	7:00 to 7:40 p.m.	Plantation Inn
Workshop 3: Reptiles and Amphibians as Indicators	7:40 to 8:30 p.m.	Plantation Inn
Critter Walk Activity	8:30 to 10:00 p.m.	Plantation Inn
Kayak Activity (Guided tour for those who bring kayaks).	8:30 to 10:00 p.m.	Kings Bay

DAY TWO (June 13) Activity

Activity	Time Period	Where
Habitat Assessment and Bird ID Activity	6:30 to 8:30 a.m.	TBD
Buffet Breakfast	8:30 to 9:30 a.m.	Plantation Inn
Workshop 4: Water Quality & Biomonitoring Techniques	9:30 to 10:30 a.m.	Plantation Inn
Break	10:30 to 10:45 a.m.	TBA
Field Sampling Experience	10:45 to Noon	Kings Bay
Workshop 5/Boxed Lunch: Habitat Quality Sampling Techniques	Noon to 1:30 p.m.	Plantation Inn
Field Sampling Experience	1:30 to 3:00 p.m.	Kings Bay
Break	3:00 to 3:10 p.m.	Plantation Inn
Workshop 5: Data Management and Web Publication	3:10 to 4:30 p.m.	Plantation Inn
Weekend Wrap-up	4:30 to 5:00 p.m.	Plantation Inn

Meals: Dinner, breakfast and lunch are provided to attendees as part of the weekend. Your fee of \$75 will cover all meals and all conference materials. A limited number of \$25 scholarships are available.

Training: Naturalists and scientists from the Southwest Florida Water Management District, USF, FDEP, Hillsborough County and Pinellas County will lead the numerous planned workshops and field activities. Formal training and demonstrations will be held at the Plantation Inn conference facility.



Other demonstrations and nature walks will take place on the grounds of the Plantation Inn and the waters of Kings Bay.

What to bring: Closed-toed shoes and/or boots, snorkeling equipment and swimsuit, clothes you don't mind getting dirty, hat, sunglasses, sunscreen, and clothing for night activities (light jacket or long-sleeved shirt and long pants). If you own a kayak, you are encouraged to bring it to participate in the field activities. Boats will be provided for those who do not want to kayak. If you want to kayak and do not own one, A Crystal River Kayak Co is providing kayaks for the evening and afternoon field activities.



“A Weekend in My Watershed” Registration Form

Name _____
 Address _____

 Phone _____

Make checks payable to:
Florida Lake Management Society

and send to:
FLMS
PO Box 950701
Lake Mary, FL 32795-0701

Sign up for:	Price
<input type="checkbox"/> Weekend workshop (includes all meals)	\$75
<input type="checkbox"/> Add _____ additional breakfast meal (s)	\$17
<input type="checkbox"/> Add _____ additional lunch meal (s)	\$14
<input type="checkbox"/> Add _____ additional dinner meal (s)	\$27
Subtotal:	_____
Request Scholarship (\$25.00)	-\$25
Total:	_____

Are you bringing your kayak? Circle YES or NO

Questions? Please contact Jim Griffin at: griffin@arch.usf.edu or John Walkinshaw at jwalkinshaw@gpinet.com

Register before April 15th.
 This event is very popular and seats are limited.
 Please register early if you want to attend.



Explore the Springs Coast

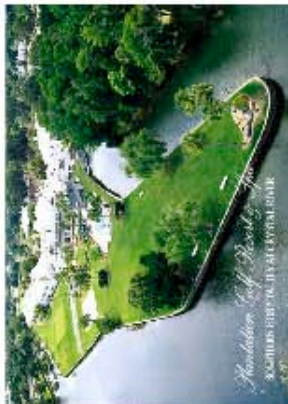
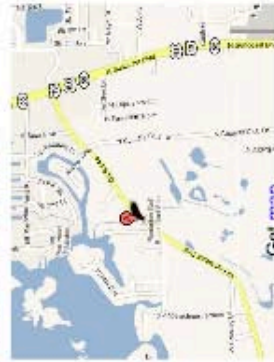
Driving Directions

From Jacksonville – approximately 125 miles 1-10 west to US 301, exit south to SR 24, SR 24 west to Gainesville, to US121, Southwest on SR 121 to US19, South on US19 to SR 44 intersection in Crystal River. Continue on US 19 south to 2nd traffic light, W. Ft. Island Trail. Turn right and go 4/10th of a mile. Located on the right side.

From Tampa – approximately 90 miles Southwest on SR 121 to US19, then South on US 19 thru SR 44 intersection in Crystal River. Continue US 19 south to 2nd traffic light, W. Ft. Island Trail and turn right and go 4/10th of a mile. Located on the right side.

From Gainesville – approximately 65 miles Southwest on SR 121 to US19, then South on US19 thru SR 44 intersection in Crystal River. Continue US 19 south to 2nd traffic light, W. Ft. Island Trail and turn right and go 4/10th of a mile. Located on the right side.

From Orlando – approximately 95 miles Florida Turnpike north to I-75. Take I-75 to exit 329 at Wildwood. West on SR 44 to Crystal River. South on US 19 to 2nd traffic light, W. Ft. Island Trail, and turn right and go 4/10th of a mile. Located on the right side.



Accommodations

All activities will be held at the **Plantation Inn**. The Plantation Inn has extended the FLMS conference room rate to all weekend attendees. Rate includes many amenities.

9301 W. Fort Island Trail
Crystal River, FL 34429
Reservations: 800-632-6262
Information: 352-795-4211
www.plantationinn.com; (Hotel Weekend Rate: \$109 per night).

Other Area Accommodations

- Kings Bay Lodge:** 352-795-2850
www.kingsbaylodgefla.com
- Best Western Crystal River Resort:** 352-795-3175
<http://www.bestwesternflorida.com/crystal-river-hotels/>
- Port Hotel & Marina:** 352-795-3111
www.porthotelandmarina.com
- Econo Lodge:** 352-795-9447
www.econolodge.com
- Holiday Inn Express Crystal River:** 352-563-1111
www.hiexpress.com

Volunteer Bulletin Board

Notice to all Florida LAKEWATCH active samplers

The LAKEWATCH lab asks that all volunteers who are taking water samples every other month but filling out a data sheet and taking Secchi readings on a monthly basis, please indicate on your data sheets whether or not water samples are being submitted with the data sheet for that month.

Thanks!

2010 Regional Meeting Schedule

Osceola County – 4/22/10

Lake County – 4/24/10

Orange County – 6/9/10

Bay, Gulf, Calhoun & Jackson Counties –
6/26/10

Seminole County – 7/8/10

Putnam County – 8/10/10

Walton, Okaloosa, Escambia, Santa Rosa,
Holmes & Washington Counties – 8/28/10

Volusia County – 9/8/10

Hillsborough, Pasco & Pinellas Counties –
10/4/10

Alachua, Hamilton, Clay & Bradford Counties –
10/19/10

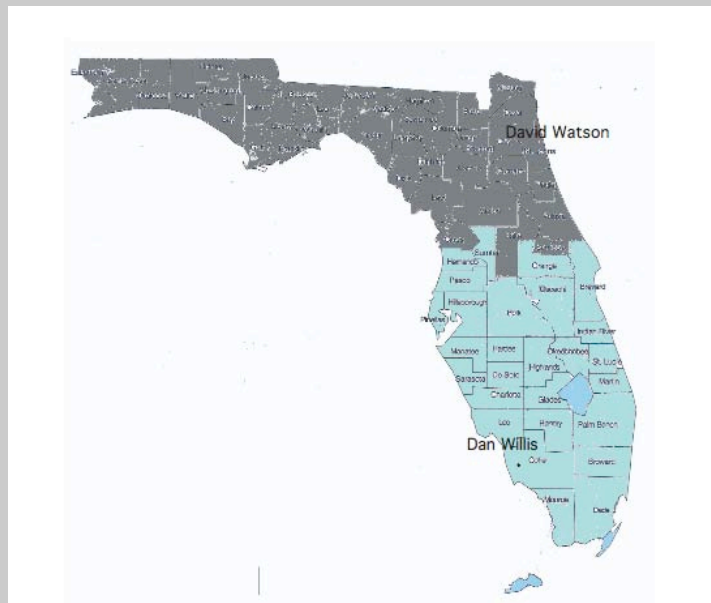
Highlands County – 11/7/10

Citrus & Marion Counties – 12/1/10

Miami-Dade, Broward & Palm Beach Counties –
12/11/10

LAKEWATCH Regions Reorganized

Florida LAKEWATCH has reorganized our regions once again to accommodate reduced funding. David Watson will now be the coordinator for north central /north Florida and Dan Willis will now be the coordinator for south central/south Florida.



*If you have any questions please call us at
1-800-525-3928*



David Watson

Dan Willis

The Life Cycle of A Blue Crab in Florida

Follow a female blue crab throughout her life.

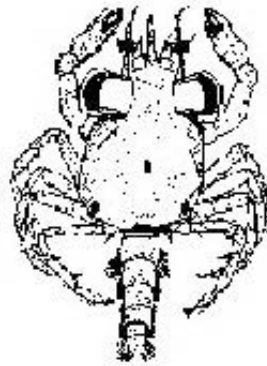
To understand the blue crab life cycle, we will follow a female blue crab from birth to reproduction. The blue crab starts her life as a larva, an early-life stage that looks completely different than her adult form. She will spend 31–49 days going through seven larval stages called zoea. In each stage she is similar in appearance, but is slightly larger than in the last stage. Even this early in life, crabs have a hard outer shell (exoskeleton). In order to grow and change stages, the larva must molt, which means shed or cast off its shell. During molting, the exoskeleton splits, and the soft-bodied larva backs out of the hard shell. The animal remains soft for a short while, and swells up by absorbing water. Then, minerals from the seawater (especially calcium) harden the outer covering, forming a new exoskeleton. When the larva loses the extra water, it shrinks and leaves space within the exoskeleton for growth.

During this part of her life, the crab floats in the open water offshore where **salinity** is relatively high. She probably



Zoael stage

feeds on microscopic algae and other small larvae (plural form of larva). After the last zoeal stage, the crab enters a megalops stage, which lasts 6–20 days. This is the first step toward obtaining the typical crab form—the body becomes wider with legs protruding from the sides, but with the **abdomen** still stretched out behind.



Megalopal stage.

The megalopa takes advantage of tidal currents to move into estuaries where salinity is lower, food is abundant, and shelter is easy to find. There, she molts to a true crab form, but is only 2 mm wide (about twice the width of a paper clip wire). As a juvenile, she is omnivorous, meaning she will eat both animal and vegetable substances, such as fish, shellfish, and aquatic plants. She also must avoid **predators** such as spotted sea trout, red drum, black drum, sheepshead, and other crabs. She continues to molt, growing larger each time until she reaches adult size (about 130-139 mm or 5.25-5.5 in.) after 18-20 molts. The amount of growth with each molt varies depending on water



Juvenile blue crab

salinity, temperature, and other environmental factors. She should reach harvestable size (127 mm or 5 in.) within one year. During her adult life, the female blue crab remains in the **estuary**, although usually in higher salinity water than males. She eats fish, **crustaceans**, worms, and **mollusks**, and may be preyed upon by large fish, birds, and mammals (including humans). Her molting rate increases during warmer months, although water temperatures greater than 30°C (86°F) appear to inhibit molting. During the cooler winter months her activity slows, although in the warmer Florida waters she will not need to slow down as much as blue crabs in more northern areas, who bury in the mud to wait for spring.



Molting blue crab

Sometime between March and December, when temperatures exceed 22°C (72°F), the female crab moves into the upper waters of the estuary where male crabs are concentrated. Most female blue crabs reach a terminal molt, after which they no longer grow. This molt coincides with the onset of sexual **maturity** when mating occurs. Evidence suggests that some females molt a second time after becoming mature, allowing them to produce more batches of **offspring**. Because of the hard exoskeleton, mating must occur directly after a molt, while the female is still soft. To ensure he will be there when she is ready, a male will usually cradle a pre-molt female in his legs. He also protects her during the vulnerable period after she molts, until her shell becomes hard again. After mating, the female moves offshore into higher salinity water while the male remains in the estuary for the rest of his life. Along the west coast of Florida, female crabs also migrate northward toward the Apalachee Bay region.

The female can retain sperm for a year or more before extruding eggs. This allows crabs mating in fall or winter to wait until warmer weather to hatch their eggs. Eggs



Mating blue crabs

are fertilized as they pass out of the crab's body and are deposited under the apron. The apron is actually the curled under abdomen, and has small **appendages** to which the eggs attach. Egg masses have an average of two million eggs, and can have up to eight million eggs. At first the egg mass appears orange due to the high amount of yolk in each egg, then turns brown as yolk is consumed and eyes develop. After one to two weeks the eggs hatch into zoea larvae. Thus the cycle of life is complete. Only one out of every one million (0.0001%) eggs survives to become an adult. Predators, adverse environmental conditions, and disease all take their toll on the millions of larvae that hatch from one female. Yet some do survive, enough to renew the population and start a new generation of blue crabs.



Ovigerous (egg-bearing female)

References:

Hines, A., P. R. Jivoff, P. J. Bushmann, J. Montfrans, S. A. Reed, D. J. Wolcott, and T. G. Wolcott. 2003. Evidence for sperm limitation in the blue crab *Callinectes sapidus*. *Bulletin of Marine Science*, 72 (2): 287-310.

Lipcius, R.N. and W. T. Stockhausen. 2002. Concurrent decline in the spawning stock, recruitment, and larval abundance, and size of the blue crab *Callinectes sapidus* in Chesapeake Bay. *Marine Ecology Progress Series* 226:45-61.

Puckett B. J. and D. H. Secor. 2006. Growth and Recruitment of Juvenile Chesapeake Bay Blue Crab. Technical Report Series No. TS-497-05-CBL Ref. No. CBL 05-095 of the University of Maryland Center for Environmental Science.

Steele, P. 1982. A synopsis of the biology of the blue crab *Callinectes sapidus* Rathbun in Florida. Pp. 29-35. *In*: H.M. Perry and W.A. Van Engle, eds. Proc. Blue Crab Colloq., Gulf States Marine Fisheries Commission Publication No. 7. Ocean Springs, Mississippi.

Steele, P. 1991. Population dynamics and migration of the blue crab, *Callinectes sapidus* (Rathbun), in the Eastern Gulf of Mexico. *Proceedures of the Gulf and Caribbean Fisheries Institute* 40:241-244.

Steele, P. and T.M. Bert. 1994. Population ecology of the blue crab, *Callinectes sapidus* Rathbun, in a subtropical estuary: population structure, aspects of reproduction, and habitat partitioning. *Florida Marine Research Publications* 54:1-24.

Turner, H. V., D. L. Wolcott, T. G. Wolcott and A. H. Hines. 2003. Post-mating behavior, intra-molt growth and onset of migration to Chesapeake Bay spawning grounds by adult female blue crabs, *Callinectes sapidus* Rathbun. *Journal of Experimental Marine Biology and Ecology* 295: 107-130.

Visit <http://research.myfwc.com/publications/> to find copies of these papers and other valuable information.

All text and images are credited to the Florida Fish and Wildlife Conservation Commission

Outstanding LAKEWATCH Volunteer

Nancy Dunn has been an active volunteer for the Florida LAKEWATCH program on Bear Lake in Seminole County since 1991. Bear Lake is located in the Apopka Upland Region at 28° 39' 0.78" and 81° 26' 59.1". This region is described as a region of residual sand hills modified by karst processes and contains many small lakes. The current land cover consists of citrus, pasture, and urban and residential development. The physical and chemical characteristics of the lakes are varied, and lake water level can be highly fluctuating through drought periods. There are some acidic, clear, softwater lakes of low mineral content; some clear lakes with moderate nutrients (some may lack macrophytes); and some darker water lakes.

Nancy grew up in Central Florida loving lakes and waterways. Her grandfather was a fishing guide on Lake Apopka in the 1930's and 40's. Nancy grew up enjoying swimming in Lake Silver in Orange County and her family loved going fishing on the weekends. They would catch fish and blue crabs in the Wekiva River and on the St. John's River and have cookouts often on the shore. The waters were clear and you could always see the sand bottom. The birds, snakes and gators made their trips exciting as

kids. She continues to fish now with her best fishing partner, her mom, Katy.

Nancy & her husband, Jim, moved to Bear Lake in Seminole County in 1974 and became involved in the Bear Lake Community Club. The residents wanted to protect Bear Lake, as it was one of the clearest lakes in the state. Swimming, sailing and fishing is how they spent their time on the lake. Jim now restores and collects antique boats as a



Nancy's mom Katy often joins Nancy to collect water samples & make observations, and also drops a fishing line over while Nancy drops over the Secchi disc!

hobby. Nancy uses her pontoon boat for LAKEWATCH, fishing and sightseeing on the Lake.

Nancy and other concerned residents such as Bob Hiedeman created the Bear Lake Preservation Association (BLPA) in 1991. They created the BLPA to manage the lakes and the activities in the watershed around Bear Lake. Nancy is involved in the BLPA newsletters and educating residents on best management practices. The focus

of BLPA since the beginning was to educate residents in the watershed on the pros and cons of fertilizing lawns and how to create berms & swales in their yards to hold pollutants and nutrients so the materials would not flush into the lake.

"I remember our LAKEWATCH training as if it were yesterday," Nancy recalls about her LAKEWATCH training session with fellow neighbors Vicki Renner, Jan Brown, Jan Shepherd and Bonnie Quigley. Being involved in making a difference and learning more about lakes was exciting then to Nancy and she just can't stop now! She has collected 214 water samples since November of 1991 on Bear Lake and has attended every Seminole County LAKEWATCH meeting during this period. She feels that she can never learn enough about Florida waterways

and considers herself a preacher of LAKEWATCH. She enjoys talking with children, residents and friends about the LAKEWATCH program and what it is doing for everyone in the state. Nancy believes "Bear Lake is just a part of the big picture of all ecosystems in Florida." Recently retired, after 30 years of service with Orange County as an Engineering Technician, she is happy to

Florida



LAKEWATCH

This newsletter is generated by the Florida LAKEWATCH program, within UF/IFAS. Support for the LAKEWATCH program is provided by the Florida Legislature, grants and donations. For more information about LAKEWATCH, to inquire about volunteer training sessions, or to submit materials for inclusion in this publication, write to:

Florida LAKEWATCH
Fisheries and Aquatic Sciences
School of Forest Resources and Conservation
7922NW71stStreet
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.

have more time to spend on the waterways.

Nancy maintains the history that the Florida LAKEWATCH program has encouraged her to collect about Bear Lake and has it stored in two 4" binders. Her observation reports include pictures and documents of all activities in the watershed affecting Bear Lake along with daily rainfall, lake levels, seasonal bird counts and more. According to Nancy "It is amazing to review the problems we have had and changes that have occurred to the lake in just the past 15 years and to be able to utilize all the data collected over 18 years."

Nancy is a dedicated volunteer to the LAKEWATCH program and it is has been a pleasure having Nancy as a member of the program. We do not come across volunteers like Nancy very often. The dedication to Lake Bear goes beyond anything we could have hoped for from a volunteer when the program was created. We commend her for the time and energy and for her continued efforts to LAKEWATCH and the Lakes of Seminole County.

Nancy, from all of us at LAKEWATCH :

THANK YOU!