Florida LAKEWATCH

Dedicated to Sharing Information About Water Management and the Florida LAKEWATCH Program Volume 58 (2012)

Volunteer Ground-Water Monitoring Coming to LAKEWATCH - AquiferWatch

Introduction

LAKEWATCH is commencing a pilot study in order to see if it is feasible to use volunteers in the monitoring of ground water. If successful, **LAKEWATCH** will expand the **AquiferWatch** program to the entire state. If you live in **Alachua** County in north-central Florida, or in **Walton** and **Okaloosa** Counties in northwest Florida, and would like to participate in the pilot study, please let LAKEWATCH know. Contact information is found at the end of this article.

As we all know, wells supply water from underground reservoirs called aquifers. These ground waters are related to surface waters, such as Florida's lakes and springs, but this relationship is unfortunately, often forgotten or ignored until Florida experiences floods or droughts. The State of Florida currently expends a great deal of money monitoring ground water, including wells in the surficial aquifer system (SAS). Nevertheless, there still are insufficient numbers of wells in all areas to assess water levels and water quality. For example, Figure 1 shows wells that are currently being monitored for water levels within the SAS by the five Water Management Districts (WMDs) or the Florida Department of Environmental Protection (FDEP).

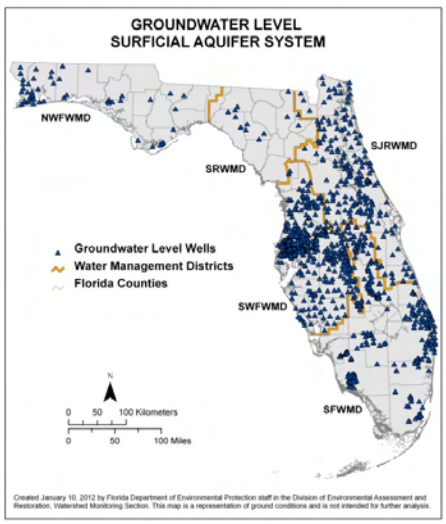

Figure 1. Surficial aquifer system wells currently being monitored for water levels by the state's water management districts agencies (Figure by S. Sunderman; FDEP).

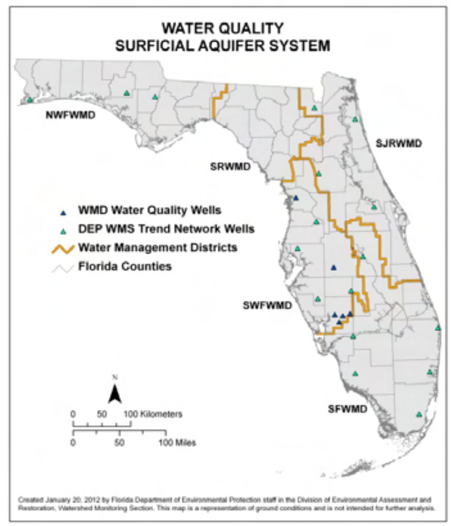

Figure 2. Incomplete map of surficial aquifer system wells currently being monitored for water quality by the state's water management districts (Figure by S. Sunderman; FDEP).

Figure 2 represents an incomplete sampling of SAS wells being monitored for water quality by the WMDs or by FDEP. FDEP is currently compiling accurate monitoring well information, including those being monitored by counties and cities. When this task is complete, the information will be forwarded to LAKEWATCH and its readers. Although additional SAS wells are being monitored, scientists need more information to address major permitting issues and insure Floridians will have adequate water supplies, but there is no money!

LAKEWATCH / AquiferWatch

Ground water is extremely important to the citizens of Florida. It is the major source of drinking water and it plays an important role in supplying water to lakes. For the past several decades, there have been many reports of ground-water levels declining in different parts of Florida (Williams et al., 2011) and that ground-water quality has changed with

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increasing salinity (Copeland et al., 2011). Clearly some of you are aware of these issues because you have contacted **LAKEWATCH** staff to express your concerns about declining lake and ground-water levels.

Figures 3 and 4 display examples as to how ground-water conditions have changed over the past two decades.

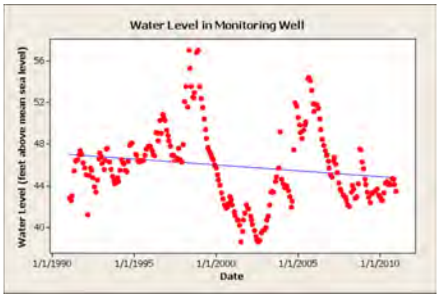

Figure 3. Water Level Fluctuations in a Monitoring Well.

In Figure 3 the water levels are displayed as feet above mean sea level in a monitoring well. Water levels peaked in 1998. They fell rapidly between 1998 and 2002, which corresponds to a severe drought (Verdi et al., 2006). Between 2002 and 2007, water levels rose, but since 2007, they have generally declined. The solid blue line is representative of an overall, downward trend between 1991 and 2011.

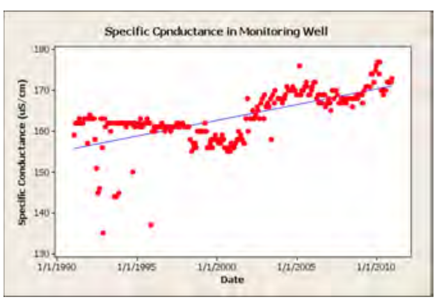

Figure 4. Specific Conductance Fluctuations in a Monitoring Well.

Figure 4 displays fluctuations in specific conductance in the same monitoring well (measured in microSeimans per centimeter (µS/cm)). Specific conductance is the measure of the ability of electrical current to travel through ground water. It is also a measure of the concentration of salinity (ions such as calcium, magnesium, sodium, potassium, alkalinity, chloride, and sulfate) in the ground water. Between 1991 and 2011, specific conductance has increased slightly in the well (solid blue line).

Florida has several fresh-water aquifer systems. The major three are the Floridan aquifer system (FAS), the intermediate aquifer system (IAS) and the previously mentioned SAS. The FAS is the most important aquifer in Florida and it is the source of drinking water for over 90% of Floridians. Additionally, most of the ground water discharging from our springs originates from the FAS. The IAS does not exist in all parts of Florida and, therefore, is only locally important. The SAS exists over most of Florida, and in portions of Florida the SAS is an important source of water supply and the system most important to lake water levels.

Ground water from Florida's aquifers can be related to lake levels and water chemistry. This is especially true of the SAS. Figure 5 depicts the relationships of water within an aquifer, wells, and a lake. In the figure, note the water table can fluctuate. During periods of normal rainfall, enough ground water exists in the aquifer to supply water to both wells in the figure. However during dry times, the water table is lowered and the shallow well can go dry. Also, note the relationship between the water table and the water level in the lake. During periods of normal rainfall, the aquifer supplies water to the lake. During an extended drought, as the aquifer dries up, so does the lake. Many **LAKEWATCH** volunteers have observed that over the past decade, Florida has suffered below normal rainfall. This is a major reason that water levels in lakes have been declining. In addition, during times of below normal rainfall, people tend to pump more ground water than during normal times (Verdi et al., 2006). This can potentially intensify the problem of declining lake levels.

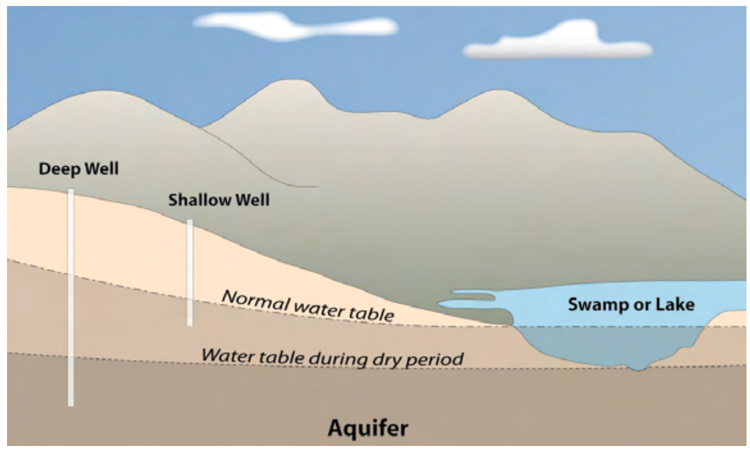

Figure 5. Relationship of water in wells, an aquifer, and a lake (Figure by J. Berke; FDEP).

Because of the issues mentioned above, **LAKEWATCH** plans to conduct a pilot program to see if volunteer monitoring of ground water can become a reality in Florida. The program is officially called **AquiferWatch working in cooperation with LAKEWATCH.** It will facilitate "hands-on" citizen participation in the management of Florida's ground water through monthly monitoring activities.

When successfully developed, the **AquiferWatch** program will enable the Florida public to be involved in a cooperative teamwork approach in solving aquifer water quantity and quality problems, by vastly increasing the amount of badly needed ground-water data generated each year. The information generated from the program will be made available through **LAKEWATCH** to anyone who wants it, including the volunteers themselves, other interested citizens, and schools.

The **AquiferWatch** program will provide citizens with educational material to foster a better understanding of Florida's ground water; which is essential for the long-term sustainability of Florida. Periodic newsletter articles and pertinent circulars on many ground-water related topics will be generated.

Wells and springs represent the direct access points to Florida's ground water. **LAKEWATCH / AquiferWatch** will work directly with anyone who owns well(s) or spring(s) and who is willing to participate in a long-term monitoring effort. As with our lake volunteer samplers, in order to become a **LAKEWATCH / AquiferWatch** volunteer, one is required to complete a short training session on monitoring their well or spring. It takes about one hour. A **LAKEWATCH / AquiferWatch** representative will visit you. He or she will teach you about aquifers and springs. All wells are constructed differently. As such, all wells cannot be sampled. The representative will determine if your well can be sampled. In the unlikely event that your well cannot be sampled, the representative will let you know why. If the well can be sampled, the representative will teach you how to collect ground-water data. We ask that once a volunteer is certified, the volunteer agrees to collect ground-water data at the well or spring for a minimum commitment of two years.

To initiate the program we will be asking that just the water level data be collected and after that phase is running smoothly we will then discuss the possibility of collecting a water sample for measurement of salinity/specific conductance. Figure 6 depicts a ground-water sample being obtained from a well. A clear tube on the left is attached to a submersible pump located within the well. Ground water is pumped through the tube to a collection device not shown in the figure. On the right, a low-voltage electrical probe is attached to the bottom end of the yellow tape. The probe is lowered through the opening of the well. When the probe hits the water table, an electrical current is completed sounding a buzzer and lighting a small light. When this occurs, the observer reads the depth to water below the measuring point (top of the inner casing (pipe) of the well) from the yellow tape and then records the depth.

Figure 6. Water sample and water level being obtained from water well.

LAKEWATCH has developed alternative approaches for the citizen scientist that work equally well. After obtaining water level data, our volunteers will be asked to record and periodically mail or email their data to **LAKEWATCH** in Gainesville. The ground-water data obtained by the volunteers will then be used to create a long-term ground-water database similar to that already established for our lakes and coastal waters. These data along with data collected by professionals will ultimately permit a comprehensive evaluation of how the conditions of our ground-water resources change over time. These data will also assist scientists in better determining the relationships between water levels in aquifers and in surface water bodies such as lakes and streams.

Participants in the **LAKEWATCH / AquiferWatch** program will receive:

- A periodic educational newsletter,
- Supplies and use of monitoring equipment,
- Individualized training in monitoring procedures,
- Periodic reports on their aquifers, including an annual data packet for their well or spring,
- Access to ground-water professionals, and
- Invitations to regularly scheduled **LAKEWATCH / AquiferWatch** meetings.

If you, or someone you know, would possibly be interested in joining, please let **LAKEWATCH** know. The contact information is below and again thank you for your support.

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AquiferWatch

Good Water for Life

Florida's Tea-Colored Lakes

There are two basic terms commonly used when referring to the color of the water in a lake or waterbody. One is known as **apparent color** and the other as **true color**. When communicating with lake residents, lake managers and others, it's helpful to know the difference between the two.

Apparent Color

Apparent color is the color of the water as seen by the human eye. For example, when a person looks into a lake, the water may appear to be colorless (i.e., clear), blue, green, yellow, red, brown, black or somewhere in between.

Most of the time, apparent colors are the result of substances that are either **suspended** or **dissolved** in the water column. However, there are other factors that can affect the apparent color of a lake including the color of the lake bottom (i.e., is it light or dark?); the depth of the lake; reflections from the sky, trees or structures surrounding the waterbody; and the presence or absence of aquatic plants. Some of these factors can be difficult to measure, which is why lake management professionals prefer to use true color measurements when assessing a lake.

Measuring Apparent Color

Some water management professionals assess the apparent color of lake water using the Forel-Ule color scale, a system developed by European lake scientists. The scale classifies lake color into 22 categories ranging from blue, greenish blue, bluish green, green, greenish yellow, yellow and brown. Using the scale, one can determine the apparent color of a lake by visually matching (i.e.,, with the naked eye) the color of the water with the Forel-Ule color spectrum.

In Europe, this system has been used as a way of defining the various levels of a lake's productivity: lakes with water that appears to be blue are considered to be less productive. Green, yellow and brown lakes are considered to be more productive. In the United States, the Forel-Ule system is seldom used for measuring the apparent color of water because it is cumbersome and difficult to use.

Reflections from the sky, trees or structures surrounding the waterbody can affect the apparent color of the lake.

Important Points to Remember About Apparent Color

- Most of the recognizable apparent color in a lake is the direct result of suspended substances in the water (i.e., both algal and non-algal matter).
- Apparent color can change significantly once suspended substances are filtered out of a water sample. That is why scientists rely less on apparent color when studying lakes and instead, usually insist on taking true color measurements before coming to any conclusions about lake color.
- Nutrients can influence the apparent color of water *indirectly* by increasing algal populations.
- Criteria used to determine apparent color is considered to be somewhat subjective whereas true color is based on actual water analysis measurements.

True Color

True color is defined as the color of water resulting from dissolved substances only; all suspended substances have been removed and are therefore not allowed to "conceal" or influence the color of the water. In the United States, when lake management professionals talk about "color," they are generally referring to true color.

Measuring True Color

True color is determined by removing all suspended substances. After the suspended substances have been removed, the samples are compared to a specific color scale. This comparison is generally done in a laboratory with a spectrophotometer.

*A **spectrophotometer** is an instrument that is used for measuring the relative intensities of light found in different parts of a light spectrum.*

In the United States, the most commonly used color scale is the **platinum-cobalt color scale**. This system is comprised of 1,000 color units or **platinum-cobalt units** (**PCU** or **Pt-Co units**). If one were to use the platinum-cobalt color scale to measure lake water that is especially clear (i.e., colorless), the color readings would probably be less than 10 PCU, whereas lakes that have a little color will have a true color measurement ranging from 20 to 50 PCU. On the far end of the spectrum, lake water that is extremely dark in color will have a color reading of 500 PCU or higher. In Florida lakes, true color generally ranges from 5 PCU to 600 PCU.

An Anecdote About True Color

True color has been found to be strongly linked to the amount of seasonal rainfall a watershed receives and the amount of runoff that seeps into a waterbody. This phenomenon has been documented with LAKEWATCH data numerous times. For example, in 1993 -1994, Grasshopper Lake, in Lake County, had Secchi depth values greater than 12 feet. This happened to be during a time of extremely dry weather. Following heavy rains in 1995 - 1996, the same lake had Secchi depth measurements of less than three feet. The difference in water clarity was associated with a change in true color from 0 PCU in the dry years to more than 50 PCU after the heavy rains.

Important Points to Remember About True Color

- True color measurements are especially helpful to lake scientists because they provide a standardized way of assessing the color of a waterbody.
- True color is a component of apparent color.
- True color does not stay constant; it can increase dramatically, especially after prolonged rain events or it can decrease under severe drought conditions.
- Waterbodies with limited suspended particles will generally have true color measurements that coincide with the visual appearance of the water. However, in waterbodies with an abundance of suspended particles, true color measurements will not necessarily coincide with apparent color. For example, algae or clay particles can make the water appear to be a certain color, but once the particles are filtered out, its appearance may change significantly. That's one reason why lake management professionals prefer to use true color measurements instead of apparent color.

Now that we've learned about the two basic ways that lake scientists define color, we will discuss suspended substances and dissolved substances in greater detail, as they are particularly important to understanding the color of a waterbody.

Suspended Substances

There are any number of naturally occurring suspended substances that can be found in Florida lakes or waterbodies. In lake management circles, they are also referred to as **suspended matter** or **particulates** and they are usually classified into two basic groups: **algal matter**, which consist of algae cells suspended in the water column and **non-algal matter** which includes fine soil particles or non-living plant material. Both are described in greater detail below.

Algal Matter

In many cases, apparent color in Florida lakes is due to large concentrations of algae suspended in the water. In other words, if there are enough algae in the water column, lake water will appear to be the same color of the actual algal cells. Sometimes, this results in a short-term event, an algae bloom for example, or sometimes lakes maintain a particular color for many months or years, due to the presence of a dominant algal species. Depending on the species and the amount of algal cells in the water, such blooms can impart a variety of colors to the water:

- Blue-green algae are dominant in the more eutrophic lakes and impart a dull-green appearance to the water. When large amounts of blue-green algae float to the surface, it may look like someone dumped a bucket of blue-green paint into the water.
- Yellowish-brown colors are frequently noticed in waterbodies where diatoms dominate the algal population.

True color measurements are especially helpful to lake scientists because they provide a standardized way of assessing the color of a waterbody.

• Botryococcus (pronounced Ba - TREE - o - cockus) is a type of algae that gives many Florida lakes a rusty or orange-brown color. It is often most visible during afternoon hours when it tends to float to the surface. At times, Botryococcus produces an oily sheen on the water, fooling people into thinking there's been a gasoline or oil spill.

• Many turbid lakes display a green hue due to green chlorophyll pigments within the algae. However, at times, some waterbodies have been known to develop a blood-red color. The cause of this red coloration is the alga Euglena, which produces a red pigment during intense periods of sunlight to protect its green chlorophyll pigment.

The dominant dissolved substances found in water are typically organic compounds including humic acids and tannins that originate from many types of terrestrial and aquatic plants.

Non-algal Matter

Suspended particulate matter that is not of algal origin can also influence the apparent color of water. This includes both organic matter (e.g., tiny particulates from dead aquatic and terrestrial plants) or inorganic particles (e.g., clay, sand, soils). These materials are usually introduced to a lake from storm-water runoff or erosion of the shoreline. In Florida, these lakes, which are often described as "muddy," are in the minority. However, they do exist. In the northern part of the state, some lakes receive large amounts of red clay resulting in a distinctive reddish "Georgia clay" appearance. Lake Talquin and Lake Seminole are good examples. Other lakes receive inputs of grayish-white colored clay, giving them a milky white appearance.

In flatter parts of the state, erosion or runoff-related color is rare. However, the central and southern portion of Florida does have its share of lakes that are influenced by non-algal suspended sediments from *within* the lake itself. Lake Okeechobee and Lake Apopka are prime examples. In Okeechobee, water depth at numerous mid-lake locations is typically 2.7 meters (8.8 feet) and in Lake Apopka, the average mid-lake depth is 1.7 meters (5.6 feet). Because of the shallow depth and large amount of fetch (*the distance that wind can travel over water before intersecting a land mass)* in both lakes, wind is able to constantly re-suspend sediments from the bottom and mix them throughout the water column causing changes in apparent color. This is known as **turbidity-related color**. Needless to say, water clarity at these same mid-lake locations is quite low (i.e., as measured by a Secchi disk), typically less than 0.33 meters (one foot).

There are also instances in which colloidal substances (i.e., particles tiny enough to pass through a filter) remain in a sample and affect water color. This is particularly true in limerock pits where inorganic materials such as calcium and magnesium carbonates will give water a green or emerald hue.

Dissolved Substances

Dissolved substances can affect both true and apparent color. These substances enter lakes via a variety of pathways including surface water runoff from the surrounding watershed, following rain events, and the leaching of organic compounds from decomposing plant material within the lake itself.

Organic

The dominant dissolved substances found in water are typically organic compounds including humic acids and tannins that originate from many types of terrestrial and aquatic plants. There are literally hundreds of lakes in Florida that are colored due to the presence of these substances. Lake Charles, in the Ocala National Forest, is a good example of this type of lake; the clear brown tea-colored water is the result of humic acids entering the waterbody from the surrounding watershed. Lakes with small amounts of these substances will generally appear green in color. (In this instance, the color is not related to algae.) As the waterbody receives more dissolved organic matter, the color will begin to shift from green to yellow-green, to a yellow-brown and then a "clear" brown.

In addition to the compounds described above, algae can be another source of dissolved organic matter in water. The substances are released directly into the water from the algal cells. This type of organic matter can change the true color of a lake by affecting light absorption. However, when algae are very abundant, they can also affect apparent color as described earlier.

Inorganic

Dissolved inorganic substances can also influence color in lakes. For example, in waterbodies that receive inputs that are high in dissolved iron compounds, might be described as rusty or orange-brown.

SPINY LOBSTER-Mysterious Crustacean of the Caribbean

By the Florida Fish and Wildlife Conservation Commission-Fish and Wildlife Research Institute

The beautifully marked Caribbean spiny lobster has long been a favorite Florida seafood and is one of our most important fisheries. As a result, marine conservation laws have been implemented to protect this valuable species from being overexploited, and management efforts are continually being examined to ensure the sustainability of this fishery.

Description

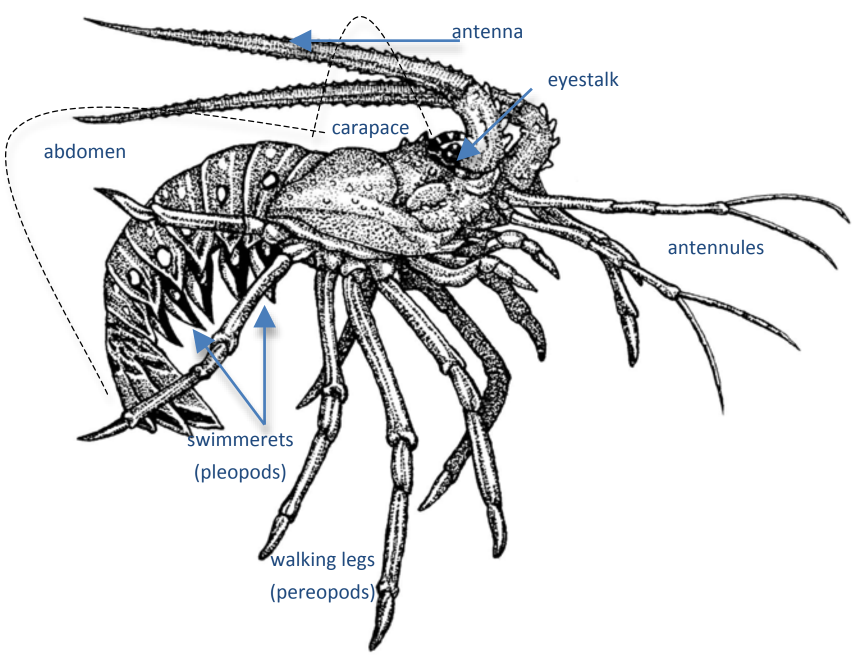
The Caribbean spiny lobster (*Panulirus argus*) is a crustacean closely related to crabs, shrimp, and crayfish. Common names for this lobster include crayfish, crawfish, langosta, and Florida lobster. There are about 12 species of lobster in Florida; Caribbean spiny lobsters are by far the largest and most abundant. They vary from whitish to a dark red-orange. The two large, cream-colored spots on top of the second segment of the tail section are the diagnostic features for identifying this species. There are also two smaller cream-colored spots adjacent to the tail fan. Spiny lobsters lack the large, distinctive, crushing claws of their northern cousins, the American lobster.

The name "spiny" comes from the strong, forward-curving spines projecting from the hard shell that covers the body and antennae of the lobster. The spines act as protection from predators and can present a hazard to anyone handling the animal without wearing gloves. There are two large prominent spines, sometimes called horns, above the eyes.

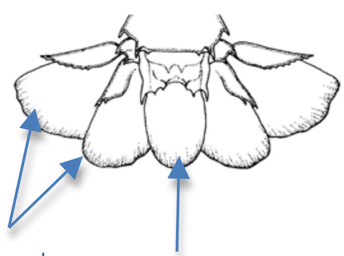
A spiny lobster's body has two main parts: the cephalothorax (head section) and the abdomen (tail section). The cephalothorax comprises the head, a cape-like carapace or shell, the mouthparts, antennae, antennules (smaller antennae-like structures), and ten walking legs. Spiny lobsters wave their long, spiny antennae like whips for fighting and defense. They use the shorter antennules to sense movement and detect chemicals in the water. The lobster's mouth, located on the underside of and toward the front of the cephalothorax, is surrounded by large, heavy structures called mandibles, or jaws, and by maxillipeds, or accessory jaws. Both sets of jaws are used for biting and grinding food and directing it into the mouth.

The abdomen, or tail section, is narrower than the cephalothorax. The shell covering the tail section is divided into six ring-like segments, and each segment ends in a spine on each side. Under the tail are four pairs of small leaf-like structures called pleopods (or swimmerets). The tail ends in a flat, flexible fan with a broad center section—the telson—and has two lobes on each side of the telson called uropods. This fan generates the thrust needed for the animal to "tail flip"—a rapid backward escape mechanism that presents an armored, thorny front to any potential enemy.

To determine the sex of a spiny lobster, examine the underside of the cephalothorax and tail section. At the base of the fifth pair of the male's walking legs are openings called sperm ducts, which become greatly enlarged during the breeding season. Also, the second walking legs of mature males are much longer than the other walking legs. The fifth pair of a female's walking legs have hook-like structures at the tips, but her second legs are not longer than the others. On a male, the pleopods beneath the tail section are single and paddle-like. Each pleopod on a female has two lobes; one lobe is paddle-like, and the other lobe resembles small pincers.



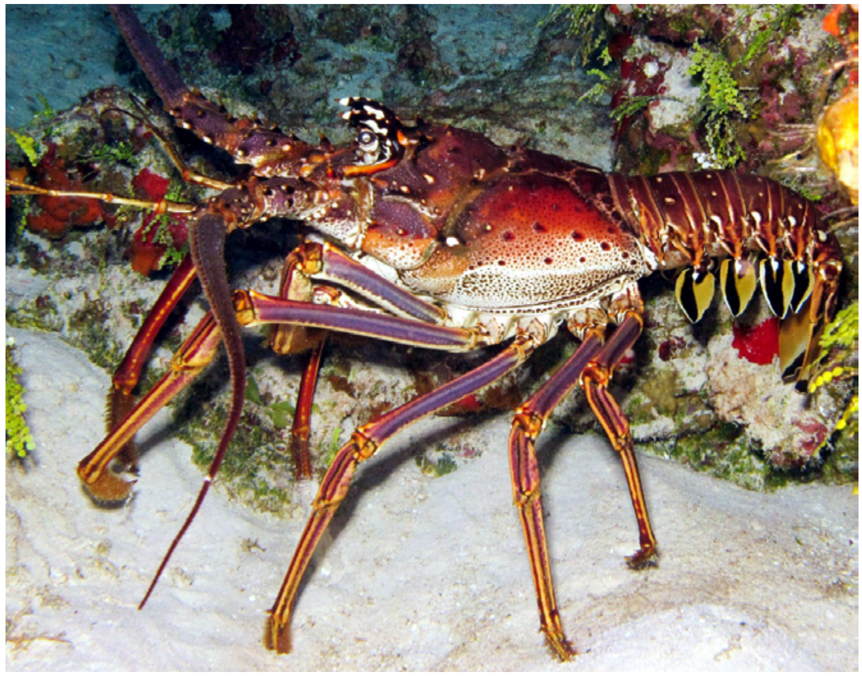
TAIL FAN



Lobster art by James Seagle; Tail fan art by Diane Rome Peebles

Life History

The peak mating and spawning season of the Caribbean spiny lobster is between March and July. When lobsters mate, the male deposits a sperm packet, or spermatophore, on the underside of the female between her fourth and fifth walking legs. The sperm packet is a light, pinkish-gray when deposited and darkens to black as the covering develops; because of the dark color, it is commonly called a “tarspot.” When ready to fertilize her eggs, the female scratches the spermatophore with the little hook on her fifth walking leg to release sperm when she discharges eggs from her oviducts. The fertilized eggs attach to long hairs called “setae” on the pincer-like lobes of her pleopods. During the three-week incubation period, the orange egg mass becomes dark brown as the developing young use up the yolks. A female lobster carrying eggs is said to be “berried.”A female lobster with a three-inch carapace can release about 250,000 eggs per spawn, and a female with a four-inch carapace can produce over a million eggs. Large lobsters typically spawn two or three times during the annual mating season; smaller animals may spawn only once a year.



A Caribbean spiny lobster showing the swimmerets (pleopods) on the abdomen.

A spiny lobster begins life looking nothing at all like an adult. A newly hatched lobster enters the world as a tiny, flat, spider-like larva called a phyllosome and is transparent except for pigment in the eyes. The newly hatched larval lobster drifts in the ocean, feeding on other tiny drifting animals (plankton). Carried by ocean currents, the drifting phyllosome passes through 11 developmental stages before finally changing into a transparent, swimming, lobster-like form called the puerulus. Scientists have long thought this larval stage lasts as long as 9 months, but in 2005 *P. argus* larvae were reared by one lobster scientist from a phyllosome to a puerulus in 142 days.

The puerulus does not feed at all; its mission is to swim from the open ocean to nearshore waters and find a place to settle, preferably in clumps of red algae in a hardbottom area. Occasionally, the puerulus will settle in seagrass. By the time the puerulus has found a suitable habitat, it has begun to develop brown and white markings as camouflage. Within a week of settling, the puerulus molts and develops into a juvenile spiny lobster.

A juvenile lobster feeds at night on crustaceans and mollusks and hides during daylight hours, a nocturnal pattern that continues throughout adulthood. As the lobster grows, it molts. When a lobster molts, a line along each side of the carapace splits and the soft, flexible animal backs out through the opening. The soft, vulnerable animal quickly absorbs water and expands before the new, and larger, exoskeleton hardens. The process of molting and acquiring a new exoskeleton takes about two days.

About three months after settling, with a carapace length of about one inch (2.5 cm), a juvenile leaves the algal clumps for a hardbottom habitat of sponges, solution holes (mini-sinkholes), and small coral heads. About two years after the puerulus settles, the lobster has reached a carapace length of about three inches. Sexual maturity is also reached around this time.

As spiny lobsters mature, they migrate seaward to offshore reefs. In remote areas or when protected from fishing, spiny lobsters can grow to over 15 pounds and may live for 20 years.

Range and Habitat

Caribbean spiny lobsters are widely distributed throughout the tropical and subtropical waters of the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico, inhabiting the seas around Bermuda, the West Indies, and southern Florida. They have been reported as far north as Beaufort, North Carolina, and as far south as Rio de Janeiro, Brazil.

Adult spiny lobsters live in the caverns and crevices of coral reefs and hardbottom areas, hiding during the day and emerging at night to hunt and eat. Both juveniles and adults are opportunistic feeders and will eat a wide variety of prey. Their preferred diet is small crustaceans and mollusks.

Occasionally adult lobsters participate in mass migrations, marching in line from shallower water to deeper ocean in response to some environmental cue. Each animal uses its antennae to maintain contact with the one ahead, a behavior known as “queuing.” A line or queue (pronounced cue) of lobsters may have only a few or more than 60 animals marching seaward. Because moving through water creates considerable drag, each lobster behind the leader saves energy by taking advantage of the turbulence created by the one ahead. As the leader tires, another moves up to become leader and the leader falls back to another place in line. If attacked, the queue forms a circle with their antennae facing outward, like a herd of bison facing a predator.

Economic Importance

Spiny lobsters have long been an important commercial and recreational fishery in south Florida, particularly in the Keys. The commercial lobster fishery in Florida has been dominated by the use of traps since the 1960s. Since 2000, the commercial landings of Caribbean spiny lobster in Florida have fluctuated between 3.4 million pounds and 5.8 million pounds per fishing season. Typically, 90% of the landings are from the Florida Keys.

The regular eight-month season for the Caribbean spiny lobster in Florida opens each year on the 6th of August and closes on the 31st of March the following year. Prior to the opening of the regular season, there is a two-day recreational sport season on the last Wednesday and successive Thursday of July each year. Approximately 40% of a season’s landings are brought in during the first month; landings decrease sharply afterward. Landings decline further after the opening of the stone crab fishery on the 15th of October.

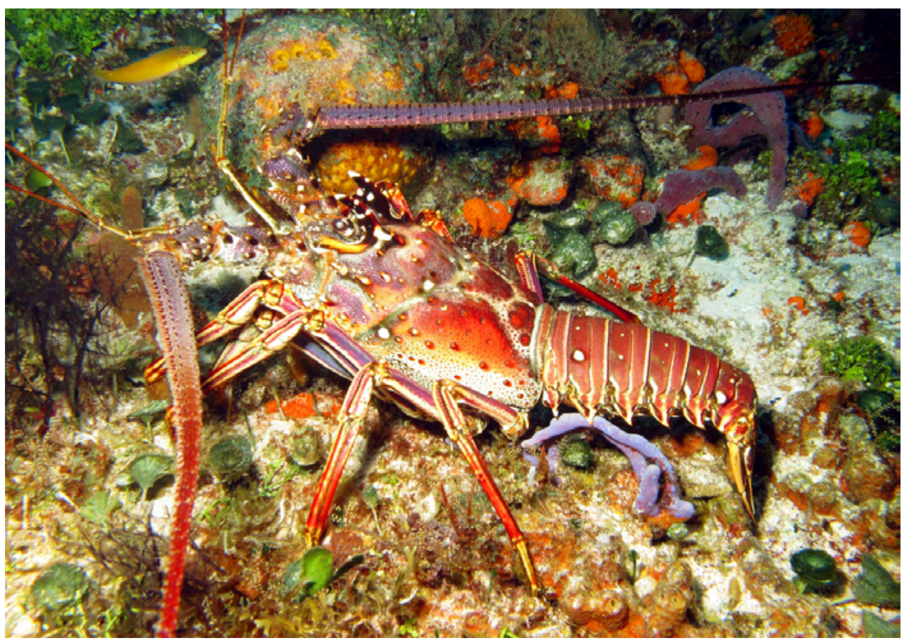
Although Florida lobsters have probably been harvested for personal consumption since the first humans arrived here, it could be argued that the sport of lobster fishing began in the 1930s with the “goggle fishermen.” These were free divers (no scuba gear, just a mask) and were therefore limited to shallow water. Deeper recreational fishing did not occur until the popularization of scuba diving in the 1950s. Today, the typical recreational harvest is 1.5 to 2 million pounds between the start of the two-day sport season in July and Labor Day—or 20% to 25% of the season’s total harvest of spiny lobster.

Management Efforts

There has been a tremendous increase in the worldwide demand for all species of spiny lobsters, creating a need for sound management of existing stocks and for more comprehensive research upon which to base management decisions.

State marine conservation laws were implemented to protect the spiny lobster population in Florida. Among the most important laws are those designed to protect the lobsters’ reproductive capabilities. Conservation regulations prohibit harvesting lobsters between April and August (except for the two-day recreational sport season at the end of July) to protect egg-bearing females from harvest during their peak spawning period. Regulations also prohibit the take of any egg-bearing female.

Recent changes in regulations have designated many marine protected areas in the Florida Keys where the taking of Caribbean spiny lobsters is prohibited at all times. These areas are Everglades National Park, Dry Tortugas National Park, the Card Sound–Biscayne Bay Sanctuary, and the marine reserves of the Florida Keys National Marine Sanctuary.



http://reefguide.org

A Caribbean spiny lobster photographed in Cozumel, Mexico.

This article is a reprint from the “Sea Stats” series, this version published in June 2010. For more information contact:

Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute
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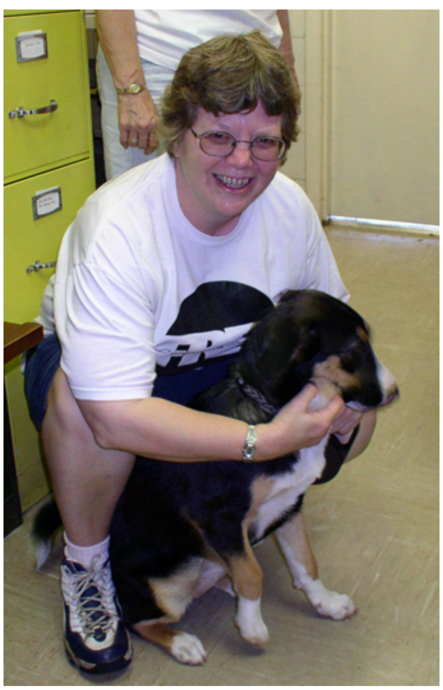
Volunteer Bulletin Board

Farewells and arrivals from the Water Lab:

We bid farewell to valued laboratory technician and gracious friend Wanda Garfield. Wanda accepted another position within the University involving information technology and web design. Information technology has long been an interest of Wanda since joining Florida LAKEWATCH. She has been enthusiastic in approaching new tasks and holds to a high degree of professionalism in implementing her assigned duties. Her diligent efforts in maintaining a professional quality yet relaxed manner in dealing with people place her in a unique group of dedicated personnel that represent the very best at the University of Florida. Wanda's dedication to detail, innovative ideas, and keen sense of humor will serve her well in her new endeavor and we wish her much success and joy in her new career.



Wanda Garfield

The core of our Florida LAKEWATCH water lab team: Tad DeGroat, Ivelisse Ruiz-Bernard and Steve Banes, will be joined by a new technician from outside of the University.

This August, Fred Reeves was tapped from a long list of potential candidates to join us.

Fred comes to us from the private sector with lab and field experience from the environmental consulting field. Fred brings strong skills and technical expertise in chemical analyses and a great work ethic. Fred has already begun the task of becoming familiar with LAKEWATCH lab protocols and cross training exercises. Welcome to the LAKEWATCH Family Fred!

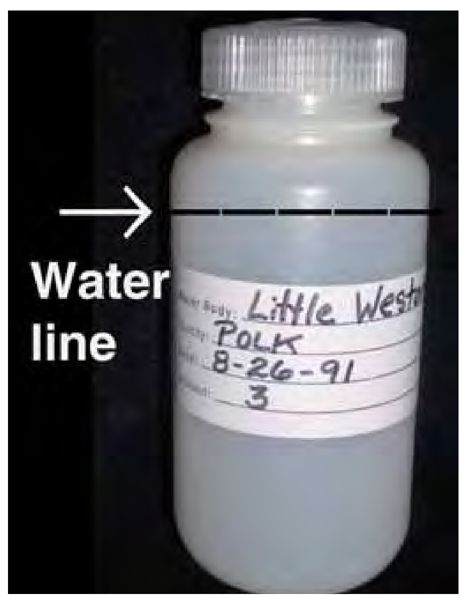
Fred Reeves

Reminder on filling water bottles

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 below.



Outstanding LAKEWATCH Volunteer

Dan Willis

Outstanding LAKEWATCH Volunteer Margo Yourick inspecting the plant display at the Okaloosa/Walton County LAKEWATCH Regional meeting in August of 2012.

Margo Yourick has been sampling Peach Creek in Walton County for approximately 20 years. Peach Creek is located approximately 1 mile to the east of County Hwy 395 on Hwy 98 (30° 21' 27.48" / 86° 6' 27.12"). She started sampling when a wastewater treatment plant came online near Peach Creek.

Margo has been a LAKEWATCH volunteer since 1993 during which she has received her LAKEWATCH cap, 2-year, 5-year and 15-year award pins. But Margo said that her best volunteer award she has received from LAKEWATCH is her coveted LAKEWATCH Outstanding Volunteer paddle (given after 15 years of service). An award LAKEWATCH was very proud to give Margo.

Margo's mother has supplied her with three canoes and one kayak so far during the last 20 years to complete the sampling. Why has she needed three canoes and a kayak? **The three canoes where all stolen over the past 20 years!**

Margo is a fourth generation Florida cracker and has always enjoyed the great outdoors. She and her two children (now grown) have extensively traveled and camped in many of the state parks all over the southeast. Margo loves plants and this love has given her the nick name the "Plant Lady". This name has been with her most of her life. This connection with plants led her to open a small business that specializes in the maintaining of the plants in commercial buildings and private residences. Margo is also involved in the Point Washington Historical Society and she also maintains a butterfly garden at a state park near her home.

Margo wanted to express in this article that LAKEWATCH and the Choctawhatchee Basin Alliance (a local group affiliated with the Northwest Florida State College that promotes ecosystem management and sustainable economic development in the basin) are wonderful organizations that help protect Florida's most precious resource, our water.

LAKEWATCH would like to thank Margo for long-time and future commitment to Florida's water resources and the LAKEWATCH program. This programs' success has only been possible due to the Margo Yourick's of this state. Again, Thank You Margo!

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Florida
LAKEWATCH

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Margo receiving her paddle at the 2007 LAKEWATCH Regional Meeting in Okaloosa/Walton Counties from former LAKEWATCH Regional Coordinator and current Director of The Choctawhatchee Basin Alliance Julie Terrell.