UF UNIVERSITY of FLORIDA
IFAS Extension

aqua-notes

Sea Grant Florida

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Mark your calendars…

- May 2, 9 am—noon; Palm Coast Arbor Day (Town Center)
- May 15-17: Florida Marine Science Educators Association conference, Sarasota, FL. See www.fmsea.org for more information.
- May 22-24; Florida Folk Festival, Stephen Foster State Park, White Springs.
- More on back page!

Inside this issue:

Success story

The Southeastern United States has been experiencing drought conditions for the past several years. Each person in Florida uses about 120-150 gallons of water per day; more than half of this is used outdoors on lawns and landscapes. Many Florida residents are not aware of the many simple ways that they can conserve water. I periodically offer an adult "day camp" program, "Exploring our Environment—from the ocean to the river." During this program, participants learn about water conservation methods ranging from capturing cold shower water to use for watering plants and animals to using rain barrels for non-potable water. Sixty-two participants who had taken the class over the past five years were asked to complete an online survey. Of the 24 adults who completed the survey, eighteen (75%) stated that they had changed their water use practices as a result of participating in the class. This included reducing water use in the shower, toilet or sprinkler. Three participants reported saving from $50 to $240 per year on their water bill. One person reported a reduction in water use of 10%. How might YOU reduce your water use and save money?

M. P. McGuire

Maia McGuire, PhD
Marine Extension Agent

New Red Snapper harvest rules

Current Florida fishing regulations allow the harvest of up to two red snapper per person per day during the open season; these fish must be greater than 20" in total length in the Atlantic or 16" total length in the Gulf. This year, the start of the red snapper season for recreational anglers in the Gulf of Mexico has been delayed from April 15 (Gulf state waters) or April 21 (Gulf federal waters) until June 1. The season will close on September 30 in the Gulf of Mexico. The hope is that this shorter recreational fishing season will reduce the harvest of red snapper and will allow stocks to start to rebound. In the Atlantic, there is currently no closed season for red snapper fishing. However, the South Atlantic Fishery Management Council has proposed a closed season of at least 180 days to start in late June or July of 2009. The Atlantic closure would affect both recreational and commercial harvest of red snapper. The Council is expected to vote on the closure at its June meeting in Stuart, FL. A detailed agenda for the meeting will be available in May at the Council's website: www.safmc.net.

Horseshoe crabs

When is a crab not really a crab? When it's a horseshoe crab! There are three species of horseshoe crabs in the world, but only one is found in the Atlantic Ocean. The horseshoe crab, *Limulus polyphemus*, can be found in coastal waters from the Yucatan Peninsula to Maine, and is most closely related to spiders, scorpions and ticks. Unlike other crabs, horseshoe crabs have no antennae. Instead of a single pair of claws, horseshoe crabs have five pairs of walking legs with claws, and a pair of feeding appendages which have pincers. The pair of legs closest to the rear of the animal is larger than the others and is used by the horseshoe crab to push itself forward.

Horseshoe crab molt (shell) washed up on the shore.

Horseshoe crabs have ten eyes (defined as structures containing photoreceptors). The two large compound eyes can easily be seen on the upper surface of the shell. Five tiny "eyes" are also located on the upper, front portion of the body. There are additional photoreceptors located on the animal's tail. Scientists use the compound eyes of the horseshoe crab to study vision, specifically to learn more about how the cells of the retina work. Despite this, horseshoe crabs really cannot see very well in the daytime. However, horseshoe crabs do have good night vision!

Horseshoe crabs breathe underwater using five pairs of book gills, which are covered by a sixth, protective pair of covers. Horseshoe crabs do not have blood like ours, but they do have a circulatory system which contains hemolymph. This fluid is sometimes referred to as "blue blood" because its copper-based hemocyanin turns blue when exposed to air. By contrast, human blood contains hemoglobin, which contains iron and which gives it its red color. Hemolymph contains a clotting compound which is used by pharmaceutical companies for testing drugs and other intravenous products. About one third of a horseshoe crab's fluid can be removed without harming the animal, which is then released. The fluid is then used to conduct tests on the products. If the products are not sterile, the horseshoe crab "blood" will clot.

Baby horseshoe crab viewed under a microscope.

The tail, or telson, of the horseshoe crab is not used as a weapon by the animal. Rather, it is used as a lever to help the animal turn itself right side up if a wave flips it over. The telson is attached to the body by a joint much like the one in a human hip or shoulder, which allows it to rotate in many directions.

Horseshoe crabs (cont.)

Like true crabs, horseshoe crabs must molt (shed their old shell) in order to grow. This process allows the crab to detach its epidermis from its shell so the animal can crawl out of the shell. Unlike true crabs, the horseshoe crab will crawl forward out of the old shell, rather than backing out of it. Once the animal is free of its old shell, it will take in water to enlarge its new, stretchy shell layer. After a period of time, the new shell will harden, and the animal will have room to grow again. A horseshoe crab may molt 17 or 18 times before reaching its adult size. As it gets older, a horseshoe crab will molt less frequently.

Horseshoe crabs live for about 19 years, but do not become sexually mature until about 9 to 12 years of age. Male horseshoe crabs are generally smaller than females. During spring and summer full moons, pairs of mating horseshoe crabs can sometimes be observed during the high tide. The female tries to get as high up onto the beach/shore as possible to lay her eggs. A single female may lay up to 30,000 eggs at a time in a series of shallow nests that she digs in the sand. The male, which often hitches a ride on the back of the female using modified claws as hooks, fertilizes the eggs. The pale green eggs are about 2-3 mm in diameter. The eggs will hatch after 14-30 days into juvenile horseshoe crabs which look like miniature adults with very short tails! After about a year, the young crabs will have a shell width of about 4 cm.

Before they have a chance to hatch, many horseshoe crab eggs are gobbled up by migrating shorebirds, especially in the Chesapeake Bay region. Here, these eggs provide a staple food source for the migrating Red Knot as it heads to its breeding grounds in the Arctic from its wintering grounds in Florida, California and South America. Check out the PBS website for more information about the impact declining horseshoe crab populations may have on Red Knots: http://www.pbs.org/wnet/nature/episodes/crash-a-tale-of-two-species/introduction/592/.

Red knot. Photo by Mike Parr, American Bird Conservancy.

Researchers in Florida are asking the public to report sightings of live horseshoe crabs so that they can get a better understanding of the status of Florida populations. Horseshoe crabs can be spotted in the ocean and in the intracoastal waterway. Whether you see one horseshoe crab or fifty, you are asked to report the sightings by completing the online survey at http://research.MyFWC.com/horseshoe_crab. You can also report sightings by sending an e-mail to horseshoe@MyFWC.com; or by calling 866-252-9326. Information that may be requested is as follows: How many horseshoe crabs were seen? Were they mating? What was the date, time and location of the sightings? What type of habitat were they in? Were there any juveniles (smaller than 4 inches in width)?

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More "Mark your calendars"

- May 28—Living Shorelines Workshop (Port Orange). Contact Nicole Adimey (nicole_adimey@fws.gov)
- June 3-22: Florida Master Naturalist Program, Coastal Module (Duval Co.) See www.masternaturalist.org for more information and to register.
- June 29-July 3: National Marine Educators' Association Conference, Monterey, CA. See www.nmeaweb.org for more information.
- August 8: Marina Day at Camachee Cove Yacht Harbor.
- August 10-13: Maia will teach a Coastal Critters 4-H camp at the Whitney Lab. Open to youth aged 8-12. Contact the St Johns County 4-H office at 904-209-0430 for details. Space is limited!

Please check the calendar at http://calendar.ifas.ufl.edu for other environmental education programs around the state.