

Mark your calendars...

- May 6-June 1: Upland habitats Florida Master Naturalist class, Brevard County. See www.masternaturalist.org for more information and to register.
- May 8, 9 am-noon. Sea level rise planning workshop for land managers/ecotour operators. See planning-matanzas.org for more info & to register.
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Water

This issue of aqua-notes is focused on water and water quality. Many years ago, I saw a presentation by a water educator in which she showed the audience a cardboard box. She explained that inside the box was her water collection. She had a sample of water that was once drunk by a dinosaur. She had water that was in the ocean when Columbus discovered America. She had water that had been to the moon on the Apollo 11 mission. She described many other historic water samples that were part of her collection. Then she tipped the box slightly so everyone could see inside. There was one jar of water there. She explained that because of the water cycle, it was possible that molecules of water from all of those different times and places could all be in the same place and time now. That presentation served to educate people that there is a finite amount of water on the planet (and in its atmosphere). Water can change form (gas, liquid, solid) and change location, but the total amount of water available never increases, so it is critically important to protect this essential resource.



M. P. McGuire

Maia McGuire, PhD
Marine Extension Agent

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Water footprints...

Of all of the water on Earth, less than 1% is available as fresh water to sustain plant and animal life, including humans. In Florida, about 6.9 billion gallons of fresh water is withdrawn from aquifers or other freshwater sources each day to supply our needs from public supply to agriculture to power generation. While the majority of freshwater withdrawn is for agricultural use (40%), public supply is not far behind (37%). The average household (residential) water use in Florida is 95 gallons per person per day.

If we add the amount of water used daily, plus the water needed to produce the food and beverages that we drink, as well as that needed to make the products that we use, that value is termed our “water footprint.”



Photo credit:
Flickr user szcel

Water footprints (cont.)

In 2012, researchers at the University of Twente in the Netherlands calculated the water footprint of the world's nations, as well as the per-person water footprint for each nation. Overall, the world's largest water consumers are China, India and the US. However, when per person water use is calculated, the water footprint for US residents is the highest—the equivalent of 2,000 gallons of water per person each day. The global average “footprint” is about 1,000 gallons of water per person per day. The United Nations suggests that 3.5 planet Earths would be needed to sustain the global population if everyone were living the same lifestyle as the average European or North American.

Globally, there are 276 rivers that are bordered by two or more countries. While there have been over 450 international water agreements signed, that still leaves 60% of the world's international river basins without any type of cooperative management framework. Within the US and even in Florida, there have been disputes over water use. These are expected to escalate as the population continues to increase, and factors such as global climate change impact water availability. Perhaps it is time to remind ourselves to “think globally, act locally.” The water footprint network (www.waterfootprint.org) has a water footprint calculator which can help visualize individual water use. The extension program at Penn State has a fact sheet titled “Water Conservation Opportunities; Reduce your water footprint,” which is available online at <http://pubs.cas.psu.edu/freepubs/pdfs/F190.pdf>. Other water conserving information is available at your local county extension office.

Pharmaceuticals & Personal Care Products (PPCPs)

Advertisements for pharmaceutical products and personal care products (PPCPs) are everywhere. We are urged to “Ask your doctor if this drug is right for you” several times a day. There is no denying that health care today is greatly improved compared to 50 years ago, but the preponderance of medications may be having negative impacts on our aquatic environment.

How we choose to use and dispose of pharmaceuticals and personal care products (PPCPs) impacts water quality—the water that we drink, bathe in, and use for recreation. Most of us do not use all of the medication that we buy. But using the toilet or trash to dispose of medicine can put people, animals, and the environment at risk. Some PPCPs are easily broken down and processed by the human body or degrade quickly in the environment, but others are not easily broken down and processed, so they enter domestic sewers.

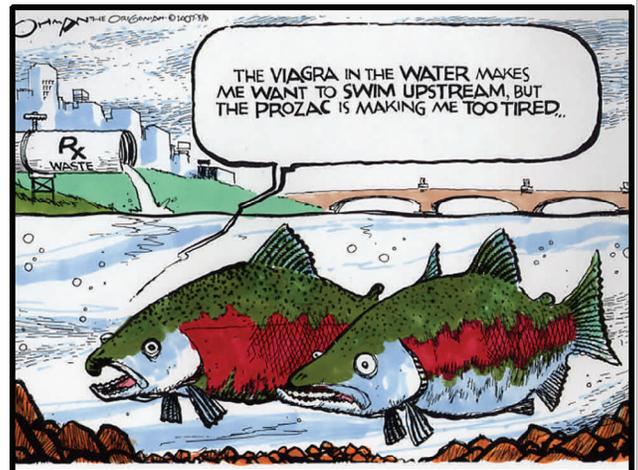
What about all the soap, shampoo, cosmetics, lotions, fragrances, and sunscreens that we use? There are thousands of these personal care products on the market. Contrary to popular belief, many of the chemicals are not regulated for safety, long-term health impacts, or environmental damage. Also contrary to popular belief, municipal wastewater treatment plants are not capable of removing all PPCPs from drinking water. Because they dissolve easily and don't evaporate at normal temperatures or pressure, PPCPs make their way into the soil and into aquatic environments via sewage, treated sewage sludge (biosolids), and irrigation with reclaimed water.



PPCPs (cont.)

The US Geological Survey (USGS) collected and tested water samples from 139 streams in 30 states between 1999 and 2000. They identified organic wastewater contaminants and pharmaceuticals in 80 percent of the sites. The drugs included antibiotics, hypertension and cholesterol-lowering drugs, antidepressants, analgesics, steroids, caffeine and reproductive hormones. Nearly a quarter of the nation's groundwater tested by the federal agency also contained contaminants. The Associated Press reported in 2008 that pharmaceutical residues, including antibiotics, anticonvulsants and mood stabilizers, had been detected in the drinking water of 51 million people in the U.S. The number of PPCPs is growing. As of 2007, over 100 individual PPCPs have been identified in environmental samples and drinking water.

The risks are uncertain. The risks posed to aquatic organisms, and to humans are unknown, largely because the concentrations are so low. While the major concerns have been the resistance to antibiotics and disruption of aquatic endocrine systems (the system of glands that produce hormones that help control the body's metabolic activity) by natural and synthetic sex steroids, many other PPCPs have unknown consequences. There are no known human health effects from such low-level exposures in drinking water, but special scenarios (one example being fetal exposure to low levels of medications that a mother would ordinarily be avoiding) require more investigation.



So what can people do to help reduce the amount of PPCPs entering aquatic systems? One way to help is to return unused medications (prescription and expired over-the-counter drugs) during one of the Drug Enforcement Administration (DEA)'s National Prescription Drug Take-Back Days. These are typically held in April and October each year. In the four previous Take-Back events, DEA in conjunction with state, local, and tribal law enforcement partners collected more than 2 million pounds (1,018 tons) of prescription medications. The National Prescription Drug Take-Back Day aims to provide a safe, convenient, and responsible means of disposal, while also educating the general public about the potential for abuse of these medications. You can find more information about this event at the DEA's website: http://www.deadiversion.usdoj.gov/drug_disposal/takeback/index.html

Another way to reduce unwanted chemicals from getting into the environment is to purchase and use products that do not contain harmful chemicals. For example, triclosan, an antimicrobial agent used in detergents, soaps and other personal care products, commonly ends up in municipal wastewater treatment plants. Here, chlorination causes it to break down into compounds which, on exposure to sunlight become carcinogenic. The American Medical Association and the American Academy of Microbiology say that soap and water serves just as well to prevent spread of infections and reduce bacteria on the skin as antibacterial soaps. Overuse of soaps containing triclosan may promote the development of bacterial resistance. To find other chemicals that should be avoided, check out the environmental working group's website at www.ewg.org.

We're now on Facebook—check out [facebook.com/NEFLSeaGrant](https://www.facebook.com/NEFLSeaGrant) and “like” it to keep informed about coastal topics in the region. Don't have a Facebook account? That's OK—you can view the page without one :)



NE Florida Sea Grant Extension Program
150 Sawgrass Road
Bunnell, FL 32110

Phone: 386-437-7464

Fax: 386-586-2102

E-mail: mpmcg@ufl.edu

<http://stjohns.ifas.ufl.edu/sea/seagrant.htm>

More “Mark your calendars”

- May 9, 9 am-noon. Sea level rise planning workshop for government/agency employees and planners. See planningmatanzas.org for more info & to register.
- May 17: Endangered Species Day. See www.endangeredspeciesday.org
- May 19: St Johns Sea Turtle Festival noon-5pm, St Augustine Municipal Marina. See www.keepersofthecoast.org for more information.
- June 1: License-free **saltwater** fishing day in the state of Florida—no license required! All other rules apply. Check fishing regulations at www.myfwc.com.
- June 4, noon-3 pm. Sea level rise planning workshop for developers, real estate professionals, business interests. See planningmatanzas.org for more info & to register.
- June 8: License-free **freshwater** fishing day in the state of Florida—no license required! All other rules apply. Check fishing regulations at www.myfwc.com.
- Various dates in June and July: Adventures in the Estuary summer camps for ages 7-10 and 10-12. See gtmnerr.org/Summer-Camps.php for more information and to register.
- Weekly from June to August: Seaside Eco-Adventures summer camps at Marineland Dolphin Adventure. See <http://www.marineland.net/education/summer-camps.html> for more information and to register.
- July 13: 10 am to 2 pm, FWC Exotic pet amnesty day event at Boyd Hill Nature Preserve (St. Petersburg, FL). Contact Jenny Novak (jenny.novak@myfwc.com or 850-617-9554) for more information.
- July 22-26: National Marine Educators Association annual conference (Mobile, Alabama). See nmea.disl.org for more information.
- Various dates June through August: “SEA the Possibilities” day camps at the St Augustine Lighthouse and Museum. See <http://www.staugustinelighthouse.com/education/salmsummercamp2013> for more information.

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

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