



# the Thalweg

Watershed Stewardship Program

Spring 2016

Volume 13 Issue 2

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[www.cobbstreams.org](http://www.cobbstreams.org)

## WSP's Rain Barrel Partnership

The Cobb County Watershed Stewardship Program has many partners, and 2015 closes the seventh season of partnership with the Coca-Cola Marietta Bottling Plant. Since 2009, Coke has generously donated nearly 1,000 barrels to our free, community Rain Barrel Make & Take program. These workshops would not be possible without Coke's contribution of empty food-grade drums, previously used to store beverage syrup concentrate. WSP's Rain Barrel Workshops provide the Marietta bottling plant with a local outlet for Coke's world-wide sustainability program, which includes a variety of efforts to provide relief and well-being to more than 200 countries. During the rain barrel workshops, residents recycle Coke's barrels by turning them into rain water harvesting devices.

Harvesting rain water for landscape irrigation is an effective way to conserve potable water. For each inch of rain, a 2,000 square foot roof sheds 1,000 gallons of stormwater. With an annual average of 50 inches of rain in metro Atlanta, a rain barrel can capture and conserve a significant amount of water. In addition to water conservation, rain barrels do far more for our water supply. In urban areas, stormwater is a threat to water quality and stream habitat. When the natural landscape is altered by increased impervious surfaces, such as concrete, asphalt, and roofing, less stormwater soaks into the ground. As runoff flows over impervious surfaces, it collects pollutants of all kinds: litter, fertilizer, bacteria, sediments, and pesticides. The now-contaminated stormwater is directed to the streams without pre-treatment, entering aquatic habitat in volumes larger than normal stream capacity can handle, often creating erosion of the banks and river beds.

The barrels donated by Coca-Cola typically hold 45-55 gallons, and with enough households utilizing them as recommended, they can make a significant impact on decreasing the amount of stormwater runoff and pollution entering our streams and drinking water sources. The Cobb County Watershed Stewardship Program would like to thank Coca-Cola Marietta for their continued support and involvement in our community programs. For more information about Coke's sustainability program, visit [www.coca-colacompany.com/sustainability](http://www.coca-colacompany.com/sustainability).

The Watershed Stewardship Program holds free community Make & Take workshops monthly between April and October. The workshop includes information about installing and utilizing rain barrels, all the materials you need to build one, and instruction on how to assemble your barrel to take home. Most workshops run about 45 minutes and are open to Cobb County residents, allowing one barrel per household.

#### Announcing Our Spring 2016 Rain Barrel Make & Take Workshops!

**April 14** • 1:00pm - 2:00pm • Cobb County Water Quality Laboratory

**May 11** • 9:00am - 10:00am • Cobb County Water Quality Laboratory

**June 9** • 11:00am - 12:00pm • Cobb County Water Quality Laboratory

For more information about rain barrels and these upcoming workshops, visit <http://tinyurl.com/cobbstreams-events>.



2016

National Park Service  
CENTENNIAL

# National Park Service Celebrates 100 Years

*Enjoy a National Park Near You*

Have you been to a National Park lately? Did you know that this is the 100-year celebration of America's National Parks? At Cobb County Watershed Stewardship, we honor and treasure our National Parks because we are partners with the same goals: to help the people of Cobb County and the Atlanta area appreciate and care for our greatest natural resource, the Chattahoochee River and its watershed. The National Park Service was Cobb County Watershed Stewardship's Partner of the Year in 2015. Now, in the Centennial Year of the National Park Service, let's take a look at the treasure in our own "backyard," our National Parks.

We have two National Parks right here in Cobb County. Kennesaw Mountain National Battlefield Park and the Chattahoochee River National Recreation Area belong to all of us. As metro Atlanta grows, swallowing our natural areas, these two Parks become more precious. Our Parks are the result of over 100 years of stewardship by the National Park Service and individuals who saw the big picture.



*Grand Canyon of the Yellowstone; William H Jackson; 1871*

Only 100 years ago, the American wilderness seemed endless. But, there were those who recognized that this was not so. On March 1st, 1872, Congress established Yellowstone National Park in the territories of Montana and Wyoming "as a public park or pleasuring-ground for the benefit and enjoyment of the people." In the years following the establishment of Yellowstone, the United States authorized additional parks and monuments, many of them carved from the federal lands of the West.

On August 25th, 1916, President Woodrow Wilson signed the act creating the National Park Service, a federal bureau in the Department of the Interior, responsible for protecting thirty-five national parks and monuments, to leave them "unimpaired for the enjoyment of future generations." Today, the National Park System of the United States includes more than 400 areas covering more than 84 million acres in 50 states, the District of Columbia, American Samoa, Guam, Puerto Rico, Saipan, and the Virgin Islands. These areas are of such national significance as to justify special recognition and protection in accordance with various acts of Congress.

Recognizing that these lands, the American people, and our cultural history are interconnected, the National Park Service has expanded its original role to include many other roles as well: guardian of our diverse cultural and recreational resources; environmental advocate; partner in community revitalization; pioneer in the drive to protect America's open space; and environmental educator.

As environmental educators, we would also add that our Parks, preserved habitats, and open spaces are vital for not only the health of the environment, our planet, and our physical health, but for our mental and spiritual health, as well. We are so lucky to have these National Parks in Cobb County, and it is the Centennial celebration of the National Parks this year. Let's get out and use them! Here's how:







## Kennesaw Mountain National Battlefield

Kennesaw Mountain National Battlefield Park is both a historic site and a place of great natural beauty with 2,965 acres of land and twenty miles of hiking trails, seventeen of which are interpretive. It is located at 900 Kennesaw Mountain Drive, Kennesaw, GA 30152. The phone number is 770-427-4686. You can hike, bring your dog on a leash, enjoy a picnic or cookout, and see a re-enactment of the great Civil War battle that took place on this site in 1864. You can also find out about the Native Americans who preceded us here, experience the deeper history of Kolb Farm, or enjoy one of the Audubon Society's best-kept secrets: Kennesaw Mountain is one of the premier birding destinations for migratory birds in our area.

Visit the Park's website ([www.nps.gov/kemo](http://www.nps.gov/kemo)) to access a Centennial calendar of events which includes such diverse things as nature photography, Home School Mondays, Ranger-led hikes and talks, Living History events, and Volunteer Trail work days. You can also go to the top of the mountain to enjoy the spectacular view. The hardy can hike the 1.2 miles up the trail. Others can drive cars up on weekdays or access the shuttle schedule for weekends on the website.

## Chattahoochee River National Recreation Area

The Chattahoochee River National Recreation Area (CRNRA) is a 48-mile-long, 10,000 acre chain of parks that stretch like jewels from Lake Lanier to Atlanta along the Chattahoochee River. The CRNRA units in Cobb County include the Units of Paces Mill, West Palisades, Cochran Shoals/Sope Creek, Johnson Ferry North and South, and Gold Branch, all located along the Chattahoochee River. In 2012, the CRNRA was designated as the Chattahoochee River Water Trail to become the first river in the US to be named a National Water Trail. There are great fishing spots (including trout), seventy miles of beautiful hiking trails, picnic areas, boat ramps, and places to view and access the river in the Parks. Trails throughout the CRNRA are frequently mapped at each intersection. You can also access trail maps on the website or get paper maps at the Park Headquarters at 1978 Island Ford Parkway, Sandy Springs, GA 30350. The phone number is 678-538-1200.

The calendar of Centennial events for CRNRA is listed on the website

([www.nps.gov/chat](http://www.nps.gov/chat)). These include the Owl Prowl campfire programs, where you can see live owl programs and take a Ranger-led night hike by the river to listen for coyotes and Great Horned Owls, or Sweep the Hooch, where volunteers help clean up the river. You can bring your kids (or bring your date!) to Frog Frolic campfires and hikes, where you might roast marshmallows, listen to the frogs, and take a beautiful night stroll with a Ranger around the pond to watch the bats, fireflies, and stars come out. There is a summer lecture series for adults, a National Water Trail event, campouts, and other volunteer workdays and events.

To make it easy to get onto the Chattahoochee River Water Trail, the Nantahala Outdoor Center now has outposts located at the Powers Island and Johnson Ferry units, where you can rent tubes, rafts, kayaks, or canoes. Contact them at their website:

<https://noc.com/plan-your-trip/chattahoochee-river>.

During the Centennial year, every fourth grader and their family can go to any National Park for free as part of the Every Kid in a Park Program. See the Every Kid in a Park website ([www.nps.gov/kids/features/2015/everyKid.cfm](http://www.nps.gov/kids/features/2015/everyKid.cfm)) to get free passes for your family. Get outside Cobb County! Enjoy and appreciate the National Park Service Centennial Year in a National Park.

*Read the upcoming summer and fall issues of The Thalweg for detailed profiles of the Kennesaw Mountain National Battlefield and the Chattahoochee River National Recreation Area.*

Images: [www.nps.gov](http://www.nps.gov)

### Resources:

100 Years: Let's celebrate! [Internet]. National Park Service; [2016 Feb 29, cited 2016 Feb 29]. Available from: <http://www.nps.gov/subjects/centennial/index.htm>

Calling all fourth graders. We need you! [Internet]. National Park Service; [cited 2016 Feb 29]. Available from: <http://www.nps.gov/kids/features/2015/everyKid.cfm>

Chattahoochee River National Recreation Area Georgia [Internet]. National Park Service; [2016 Feb 26, cited 2016 Feb 29]. Available from: <http://www.nps.gov/chat/index.htm>

History [Internet]. National Park Service; [2016 Feb 25, cited 2016 Feb 29]. Available from: <http://www.nps.gov/aboutus/history.htm>

Kennesaw Mountain National Battlefield Park Georgia [Internet]. National Park Service; [2016 Feb 19, cited 2016 Feb 29]. Available from: <http://www.nps.gov/kemo/index.htm>

Rafting, Kayaking & Tubing in Atlanta, Georgia [Internet]. Nantahala Outdoor Center; [cited 2016 Feb 29]. Available from: <https://noc.com/plan-your-trip/chattahoochee-river>



# Dissolved Oxygen

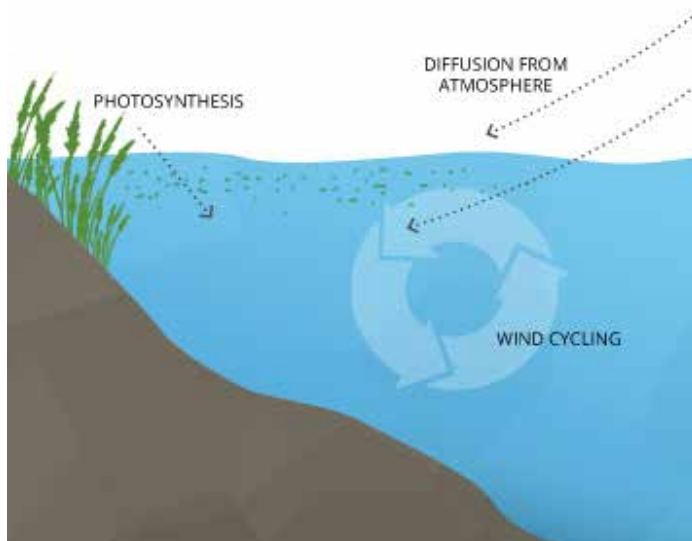
## A Deeper Look

by Christine Kemker  
Fondriest Environmental, Inc.

### WHAT IS DISSOLVED OXYGEN?

Dissolved oxygen refers to the level of free, non-compound oxygen present in water or other liquids. It is an important parameter in assessing water quality because of its influence on the organisms living within a body of water. A dissolved oxygen level that is too high or too low can harm aquatic life and affect water quality.

Non-compound oxygen, or free oxygen ( $O_2$ ), is oxygen that is not bonded to any other element. Dissolved oxygen is the presence of these free  $O_2$  molecules within water. The bonded oxygen molecule in water ( $H_2O$ ) is in a compound and does not count toward dissolved oxygen levels. One can imagine that free oxygen molecules dissolve in water much the way salt or sugar does when it is stirred.



How dissolved oxygen enters water.

### WHERE DOES DO COME FROM?

Dissolved oxygen enters water through the air or as a plant byproduct. From the air, oxygen can slowly diffuse across the water's surface from the surrounding atmosphere, or be mixed in quickly through aeration, whether natural or man-made. The aeration of water can be caused by wind (creating waves), rapids, waterfalls, ground water discharge, or other forms of running water. Man-made causes of aeration vary from an aquarium air pump to a hand-turned waterwheel to a large dam.

Dissolved oxygen is also produced as a waste product of photosynthesis from phytoplankton, algae, seaweed, and other aquatic plants.

### DISSOLVED OXYGEN SATURATION

In a stable body of water with no stratification, dissolved oxygen will remain at 100% air saturation. 100% air saturation means that the water is holding as many dissolved gas molecules as it can in equilibrium. At equilibrium, the percentage of each gas in the water would be equivalent to the percentage of that gas in the atmosphere – i.e. its partial pressure. The water will slowly absorb oxygen and other gasses from the atmosphere until it reaches equilibrium at complete saturation. This process is sped up by wind-driven waves and other sources of aeration.

In deeper waters, DO can remain below 100% due to the respiration of aquatic organisms and microbial decomposition. These deeper levels of water often do not reach 100% air saturation equilibrium because they are not shallow enough to be affected by the waves and photosynthesis at the surface. This water is below an invisible boundary called the thermocline (the depth at which water temperature begins to decline).

### WHAT AFFECTS OXYGEN SOLUBILITY?

Two bodies of water that are both 100% air-saturated do not necessarily have the same concentration of dissolved oxygen. The actual amount of dissolved oxygen (in mg/L) will vary depending on temperature, pressure, and salinity.

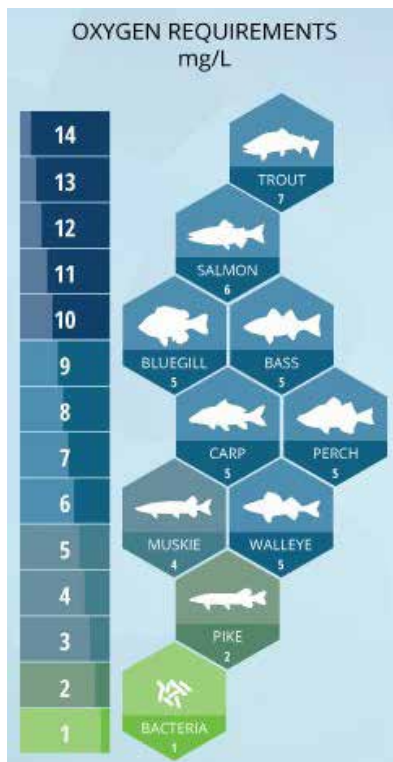
*The solubility of a substance is the amount of that substance that will dissolve in a given amount of solvent.*

First, the solubility of oxygen decreases as temperature increases. This means that warmer surface water requires less dissolved oxygen to reach 100% air saturation than does deeper, cooler water. For example, at sea level (1 atm or 760 mmHg) and 4°C (39°F), 100% air-saturated water would hold 10.92 mg/L of dissolved oxygen. But if the temperature were raised to room temperature, 21°C (70°F), there would only be 8.68 mg/L DO at 100% air saturation.

Second dissolved oxygen decreases exponentially as salt levels increase. That is why, at the same pressure and temperature, saltwater holds about 20% less dissolved oxygen than freshwater.

Third, dissolved oxygen will increase as pressure increases. This is true of both atmospheric and hydrostatic pressures. Water at lower altitudes can hold more dissolved oxygen than water at higher altitudes. This relationship also explains the potential for "supersaturation" of waters below the thermocline – at greater hydrostatic pressures, water can hold more dissolved oxygen without it escaping. Gas saturation decreases by 10% per meter increase in depth due to hydrostatic pressure. This means that if the concentration of dissolved oxygen were at 100% air saturation at the surface, it would only be at 70% air saturation three meters below the surface.





Minimum dissolved oxygen requirements of freshwater fish. Fathead minnows (*Pimephales promelas*) can survive at 1 mg/L for an extended period with only minimal effects on reproduction and growth.

In summary, colder, deeper fresh waters have the capability to hold higher concentrations of dissolved oxygen, but due to microbial decomposition, lack of atmospheric contact for diffusion, and the absence of photosynthesis, actual DO levels are often far below 100% saturation. Warm, shallow saltwater reaches 100% air saturation at a lower concentration, but can often achieve levels over 100% due to photosynthesis and aeration. Shallow waters also remain closer to 100% saturation due to atmospheric contact and constant diffusion.

If there is a significant occurrence of photosynthesis or a rapid temperature change, the water can achieve DO levels over 100% air saturation. At these levels, the dissolved oxygen will dissipate into the surrounding water and air until it levels out at 100%.



In extreme cases, such as excessive algal photosynthesis, DO concentration can build up to greater than 200 percent saturation, resulting in DO levels up to 20 mg/L. Photo: Weeks Bay National Estuarine Research Reserve System site. Credit: [www.oceanservice.noaa.gov](http://www.oceanservice.noaa.gov)

which is then plunged into the water. At greater depths and thus greater hydrostatic pressures, this entrained air is forced into solution, potentially raising saturation levels over 100%.

Rapid temperature changes can also create DO readings greater than 100%. As water temperature rises, oxygen solubility decreases. On a cool summer night, a lake's temperature might be 60° F. At 100% air saturation, this lake's dissolved oxygen levels would be at 9.66 mg/L. When the sun rises and warms up the lake to 70° F, 100% air saturation should equate to 8.68 mg/L DO. But if there is no wind to move the equilibration along, the lake will still contain that initial 9.66 mg/L DO, an air saturation of 111%.

## HOW CAN WATER BE MORE THAN 100% SATURATED?

100% air saturation is the equilibrium point for gases in water. This is because gas molecules diffuse between the atmosphere and the water's surface. However, there are several factors that can affect this. Aquatic respiration and decomposition lower DO concentrations, while rapid aeration and photosynthesis can contribute to supersaturation. During the process of photosynthesis, oxygen is produced as a waste product. This adds to the dissolved oxygen concentration in the water, potentially bringing it above 100% saturation. In addition, the equalization of water is a slow process (except in highly agitated or aerated situations). This means that dissolved oxygen levels can easily be more than 100% air saturation during the day in photosynthetically active bodies of water.

Supersaturation caused by rapid aeration is often seen beside hydro-power dams and large waterfalls. Unlike small rapids and waves, the water flowing over a dam or waterfall traps and carries air with it,

Dissolved oxygen concentrations are constantly affected by diffusion and aeration, photosynthesis, respiration, and decomposition. While water equilibrates toward 100% air saturation, dissolved oxygen levels will also fluctuate with temperature, salinity, and pressure changes. As such, dissolved oxygen levels can range from less than 1 mg/L to more than 20 mg/L depending on how all of these factors interact. In freshwater systems such as lakes, rivers, and streams, dissolved oxygen concentrations will vary by season, location, and water depth.

To read this publication in its entirety, go to <http://www.fondriest.com/environmental-measurements/parameters/water-quality/dissolved-oxygen>.

Kemker, Christine. "Dissolved Oxygen." *Fundamentals of Environmental Measurements*. Fondriest Environmental, Inc. 19 Nov. 2013. Web. <<http://www.fondriest.com/environmental-measurements/parameters/water-quality/dissolved-oxygen/>>.

## Frogs & Toads

All toads are frogs, but not all frogs are toads. While most frogs have moist, smooth skin and long legs for leaping, typical toads have dry, warty skin and short legs for hopping. Despite common belief, touching toads does not result in warts; only viruses cause warts. When toads are handled with any pressure though, toxins may ooze out from their skin as a defense mechanism. This liquid sometimes causes mild irritation, especially if you rub your eyes or mouth after holding a toad. For this reason, either leave toads alone or be sure to wash your hands after handling them.

Linda May, Environmental Outreach Coordinator  
Georgia DNR Wildlife Resources Division

## OBSERVATIONS



American toad (*Bufo americanus*)  
Credit: Kevin D. Arvin, [Bugwood.org](http://Bugwood.org)

## Stewardship Stars Excellence in Data Collection

*The following volunteers have submitted data each month during the December, January, and February quarter:*

**Anne Ledbetter** - Chemical, Biological, & Bacterial Monitoring in the Poplar Watershed  
**Bushart** - Chemical Monitoring in the Sewell Mill Watershed  
**David Zandstra Group** - Bacterial Monitoring in the Rubes Watershed  
**Environmental Club of Walton High School** - Chemical Monitoring in the Sope Watershed  
**ERM Atlanta** - Chemical Monitoring in the Chattahoochee Watershed  
**Fairfax Consulting** - Chemical & Bacterial Monitoring in the Powder Springs Watershed  
**Keep Smyrna Beautiful Adopt-A-Stream** - Chemical Monitoring in the Nickajack Watershed  
**Lassiter High School APES classes** - Chemical & Bacterial Monitoring in the Rubes Watershed  
**Morning Washburn** - Chemical & Bacterial Monitoring in the Chattahoochee Watershed  
**Nick Jokay** - Chemical Monitoring in the Noonday Watershed  
**Pope High School** - Chemical Monitoring in the Piney Grove Watershed  
**Richard's Creek** - Chemical Monitoring in the Allatoona Watershed  
**Sedalia Park Target** - Chemical Monitoring in the Sope Watershed  
**Sharon & Ric Donato** - Anuran & Chemical Monitoring in the Rubes Watershed  
**Sierra Club Cobb Centennial Group** - Chemical, Biological, & Bacterial Monitoring in the Rottenwood Watershed  
**Simon Locke** - Chemical, Bacterial, & Visual Monitoring in the Butler Watershed  
**Village North Highlands Subdivision** - Chemical, Biological, & Bacterial Monitoring in the Willeo Watershed

**Thank you for your hard work and dedication!**

### ECOPEDIA Biosphere

The biosphere is made up of the parts of Earth where life exists. The biosphere extends from the deepest root systems of trees, to the dark environment of ocean trenches, to lush rain forests and high mountaintops. Although the biosphere measures about 20 kilometers (12 miles) from top to bottom, almost all life exists between about 500 meters (1,640 feet) below the ocean's surface to about 6 kilometers (3.75 miles) above sea level.

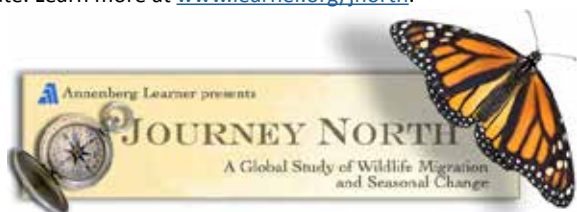
<http://education.nationalgeographic.org/encyclopedia/biosphere>

### RECOMMENDED RESOURCE

#### Journey North

#### *A Global Study of Wildlife Migration and Seasonal Change*

Journey North engages citizen scientists in a global study of wildlife migration and seasonal change. K-12 students share their own field observations with classmates across North America. They track the coming of spring through the migration patterns of monarch butterflies, robins, hummingbirds, whooping cranes, gray whales, bald eagles, and other birds and mammals; the budding of plants; changing sunlight; and other natural events. Find migration maps, images, standards-based lesson plans, activities, and information to help students make local observations and fit them into a global context. Widely considered a best-practices model for education, Journey North is the nation's premiere citizen science project for children. The general public is welcome to participate. Learn more at [www.learner.org/jnorth](http://www.learner.org/jnorth).



welcome

**Eddie Richards**

Rain & Wildlife Garden Volunteer

**Gordon Bollig**

Chemical Monitoring Volunteer



**Untitled**

Mikala Groshong  
Grade 3

Lewis Elementary School, Kennesaw  
Teacher: Kathy Frost and Karen Feathers  
2007 Georgia River of Words  
State Art Winner

### CONSERVATION TIP

#### Neonicotinoids in Your Garden

Neonicotinoids are a group of insecticides that are used widely on farms, as well as around our homes, schools, and city landscapes. Used to protect against sap-sucking and leaf-chewing insects, neonicotinoids are systemic, which means they are absorbed by the plant tissues and expressed in all parts, including nectar and pollen. Unfortunately, bees, butterflies, lady bugs, and other beneficial insects are harmed by the residues. Extremely concerning is the prolific inclusion of these insecticides in home garden products. Home garden products containing neonicotinoids can legally be applied in far greater concentrations in gardens than they can be on farms – sometimes at concentrations as much as 120 times as great, which increases the risk to pollinators. As a gardener, you have a unique opportunity to help protect pollinators. Avoid using neonicotinoids in your garden or yard and read labels to determine whether a product contains neonicotinoids, including imidacloprid, clothianidin, thiamethoxam, acetamiprid, and dinotefuran. Ask your local nursery or garden center if plants have been treated with neonicotinoids. Create patches of pesticide-free, pollinator-friendly flowers in your garden or neighborhood, and encourage your city or park district to use alternatives to neonicotinoids on plants that are visited by pollinators.

[www.xerces.org/wings-magazine/neonicotinoids-in-your-garden](http://www.xerces.org/wings-magazine/neonicotinoids-in-your-garden)

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## ANNOUNCEMENTS



### WSP Welcomes Sonya Wood Mahler

The Watershed Stewardship Program would like to introduce Sonya Wood Mahler as our new part-time Environmental Program Specialist! We are very excited to have Sonya join our team. She brings a wealth of knowledge and experience from all over the southeastern United States, and I'm sure you'll find her to be a wonderful resource. Sonya will head up our middle and high school outreach, oversee stewardship projects such as waterway cleanups, stormdrain marking, and privet pull projects, and assist with community outreach. Welcome Sonya!

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### Register for WSP Events on Eventbrite

The Watershed Stewardship Program is pleased to announce that we have begun utilizing Eventbrite, an online event and registration management platform. You can now seamlessly register for upcoming workshops, volunteer opportunities, and more on the Eventbrite website. Plus, we will be able to track registrations better with this service, helping to make event planning and communicating with participants easier. View our profile and upcoming events at <http://tinyurl.com/cobbstreams-events>.

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### 10th Annual River Rendezvous

**Saturday, April 30th, 2016**

**8:00am - 2:00pm**

**Cobb County Water Quality Lab**

It's time again for the annual River Rendezvous volunteer water quality monitoring event! The Watershed Stewardship Program and Sierra Club Cobb Centennial Group are looking for volunteers who want to have fun and be outdoors while donating their time to a good cause. River Rendezvous is an annual event that looks at water quality at thirty sites along Rottenwood Creek. Volunteers will collect samples for lab analysis, perform water quality testing and habitat surveys, and clean litter from the creek. Afterward, join us for a lunch cookout. The Sierra Club provides hotdogs and hamburgers as well as vegetarian options, and volunteers are asked to bring a side dish or dessert to share.

This is a fun, all ages event. No experience in water testing is necessary, but come prepared to be outdoors and meet others who share the passion for keeping our waterways healthy! Go to <http://tinyurl.com/cobbstreams-events> for more information and to register.

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### Volunteers Needed!

Join WSP on **Saturday, April 16th from 9am-12pm** for our community-wide **Storm Drain Marking Event in the Olley Creek watershed!** Help educate the community about stormwater pollution by joining us and other volunteers as we mark storm drains that lead to Olley Creek. In Cobb County, all storm drains lead directly to surface water, not a treatment facility. By placing aluminum markers on storm drains, you remind the community that when stormwater flows into drains, it is unfiltered and goes directly to our streams. All storm drains should remain clear of debris and other types of non-point source pollution, such as pet waste, leaves and grass clippings, fertilizers, paints, and automobile fluids.

As a team member at the event, you will be sent out to mark a targeted area, collecting litter along the way. This is a great way to help your fellow Cobb County residents while meeting others with the same mission! Want to learn more or register? Visit <http://tinyurl.com/cobbstreams-events>.

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### WSP's New Look at [www.cobbstreams.org](http://www.cobbstreams.org)

The Watershed Stewardship Program's new website is now live! Over the past several months, WSP has worked closely with Cobb County's Communications Department to design and build our new website. The updated site is icon driven, allowing for easier navigation and a cleaner look. Access the new page via [www.cobbstreams.org](http://www.cobbstreams.org).

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### Become a Cobb County "Ribbit"

Frogs and toads are excellent bioindicators because they are so susceptible to environmental changes, and now you can help collect anuran data in Cobb County by becoming a Ribbit! By collecting data on abundance and distribution year after year, we can detect population changes in a species in time to help it recover. Ribbits are Cobb County residents and citizen-scientists who share a strong environmental ethic and a love for frogs. Ribbits must attend a free training workshop and then collect data once a week, submitting the data at the end of each month. Each Ribbit will receive a frog monitoring manual, frog calls cheat sheet, a CD of Cobb County frog and toad calls, and more. Register for our free, upcoming workshop at <http://tinyurl.com/cobbstreams-events>. Ribbit ribbit!

#### Frog Monitoring Workshop for New & Seasoned Ribbits

Wednesday, April 6th, 6:00pm-9:00pm

Hyde Farm, Marietta

Registration deadline: Friday, April 1st



Like us on Facebook! We post twice weekly updates, workshop information, natural history tidbits, and more!



Follow our boards on Pinterest for environmental education and stewardship resources.

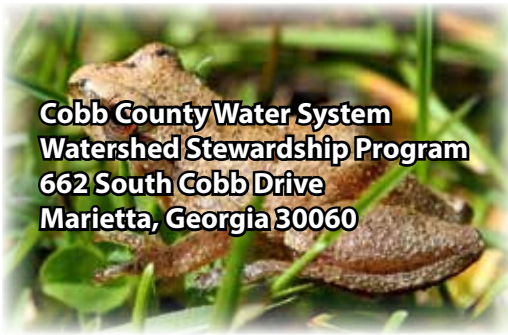


Follow our company page on LinkedIn.



Read our Rain & Wildlife Garden Phenology Blog





**Cobb County Water System  
Watershed Stewardship Program  
662 South Cobb Drive  
Marietta, Georgia 30060**

Cover photo: Spring Peeper (*Pseudacris crucifer*)  
Credit: David Cappaert, Michigan State University, Bugwood.org



*Cobb County...Expect the Best!*

This is an official publication of the Cobb County Water System, an agency of the Cobb County Board of Commissioners.

## Calendar of Events

### April

- 6 Frog Monitoring Workshop • 6:00pm - 9:00pm • Hyde Farm • Marietta, Georgia
- 7 Garden Work Day • 9:00am - 11:00am • Cobb County Water Quality Laboratory
- 9 Sweep The Hooch • [www.chattahoochee.org/sweep-the-hooch](http://www.chattahoochee.org/sweep-the-hooch)
- 14 Garden Work Day • 9:00am - 11:00am • Cobb County Water Quality Laboratory
- 14 Rain Barrel Make & Take Workshop • 1:00pm - 2:00pm • Cobb County Water Quality Laboratory
- 16 Chattahoochee Basin Challenge • Storm Drain Marking Event • 9:00am - 12:00pm • Olley Creek Watershed
- 21 Garden Work Day • 9:00am - 11:00am • Cobb County Water Quality Laboratory
- 21 Adopt-A-Stream Chemical Monitoring Workshop • 6:30pm - 9:00pm • Cobb County Water Quality Laboratory
- 22 Earth Day • Do something nice for the planet!
- 22-23 Cobb County Master Gardener Plant Sale & Garden Fair • Jim Miller Park • Marietta, Georgia • [www.cobbmastergardeners.com](http://www.cobbmastergardeners.com)
- 28 Garden Work Day • 9:00am - 11:00am • Cobb County Water Quality Laboratory
- 30 River Rendezvous • 8:00am - 2:00pm • Cobb County Water Quality Laboratory

### May

- 5 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory
- 11 Rain Barrel Make & Take Workshop • 9:00am - 10:00am • Cobb County Water Quality Laboratory
- 12 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory
- 18 Adopt-A-Stream Bacterial Monitoring Workshop • 6:30pm - 9:00pm • Cobb County Water Quality Laboratory
- 19 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory
- 26 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory

### June

- 2 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory
- 9 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory
- 9 Rain Barrel Make & Take Workshop • 11:00am - 12:00pm • Cobb County Water Quality Laboratory
- 14 Homeschool Summer Science Series • 10:00am - 12:00pm • Cobb County Water Quality Laboratory
- 15 Adopt-A-Stream Chemical Monitoring Workshop • 6:30pm - 9:00pm • Cobb County Water Quality Laboratory
- 16 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory
- 23 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory

Events in **GREEN** are Cobb County Watershed Stewardship events.  
More information can be found on our Calendar at [www.cobbstreams.org](http://www.cobbstreams.org).