

the Thalweg

Watershed Stewardship Program

Spring 2014

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Calling all Watershed Stewards!

We are looking for volunteers to organize storm drain marking projects in Cobb County! Unsure if this is the right service project for you? Here are three reasons why YOU should organize a storm drain marking project:

1. You can help educate the community.

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.

2. It's a fun and easy service project for clubs, scouts, families, and community organizations.

Simply count the number of storm drains in the area you want to mark, submit a proposal, get your supplies, and then apply the aluminum markers to the storm drain covers. If marking in a residential area, you also have the option of assembling and distributing educational packets in biodegradable plastic bags.

3. We provide all of the supplies!

The Cobb County Water System will provide marking kits upon request. The kits include aluminum markers, adhesive pads, gloves, garbage bags, and educational materials.

Plus, if you organize a Spring event, you get to enjoy the beautiful weather while participating in a service project that educates the community and helps improve water quality.

If you'd like to get your feet wet with storm drain marking but are not ready to organize an event, please join us at our upcoming community-wide **Storm Drain Marking Day on Saturday, May 3rd, 2014 from 9:00 am to 12:00 pm**. 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, get started, or register for the Storm Drain Marking Day? Visit www.cobbstreams.org or contact us at water_rsvp@cobbcounty.org or 770-528-8214.



Microplastic Beads Pollute Great Lakes

By Cheryl Hogue

Reprinted with permission from *Chem. Eng. News*, September 16, 2013, 91(37), pp 23-25. Copyright 2013 American Chemical Society.

Photograph of Great Lakes taken from the International Space Station. www.earthobservatory.nasa.gov.

An array of skin care cleansers on the market promise to exfoliate and unclog pores. Some of these skin-scrubbing products contain tiny beads of plastic scattered through a gel or creamy paste. After washing with these cleansers, consumers rinse the soapy stuff—along with its teeny spheres—down the drain, giving nary a thought to what happens to the plastic bits, which are less than 1 mm in diameter.

Now, researchers are finding plastic microbeads in the Great Lakes. They say the miniscule spheres could harm aquatic animals that mistake them for food. Perhaps more ominously, they worry that the plastic balls could help transfer toxic pollutants from the Great Lakes to the food chain, including fish that people eat.

Although these scientists' studies are not yet published*, data from them documenting the presence of microbeads in the Great Lakes have been shared with companies that make personal care products containing the beads. And those firms are responding.

Researchers gathering and analyzing information about plastics in the Great Lakes include a chemist from SUNY Fredonia and scientists from the 5 Gyres Institute, an environmental group working to reduce plastics pollution. Stiv J. Wilson, policy director of the 5 Gyres Institute, says his group provided the data to U.S. companies that make skin cleansers or other personal care products containing plastic microbeads. Johnson & Johnson, L'Oréal, and Procter & Gamble in recent months have pledged to phase out polyethylene spheres in their skin cleansers.

But these firms weren't the first personal care product makers to make this move. Leading this trend was U.K.-based Unilever. Under pressure from European environmental activists, Unilever in December 2012 announced it is working to eliminate plastic microbeads in the next three years. Meanwhile, 5 Gyres Institute says Colgate-Palmolive has also pledged to phase out microbeads from toothpaste and other products, but the company did not respond by C&EN's deadline to confirm this.

In statements that either announced or confirmed plastic microbead phaseouts, J&J, L'Oréal, P&G, and Unilever do not say why or when they initially decided to add plastic beads in products designed to be released into water.

The discovery of microbeads in the Great Lakes started with a hunch by an environmental chemist. Study after study has documented the presence of large amounts of plastic in the world's oceans, points out Sherri (Sam) Mason, an associate professor of chemistry at SUNY Fredonia. "If we find it in the oceans, we're probably going to find it in the Great Lakes," she tells C&EN.

She was part of a team of researchers who set out in the summer of 2012 to investigate that premise. In work funded by the Burning River Foundation, an Ohio nonprofit organization that focuses on protecting aquatic resources, they cruised Lakes Superior, Huron, and Erie to collect samples from the surface waters. To do this, they attached a net with 0.33-mm openings to their vessel.

The researchers then divided the plastics they'd gathered into three groups according to the longest dimension, Mason says. One group consists of pieces larger than 5 mm. A second is composed of particles between 1 and 5 mm. And the third category, microplastics, is bits that are less than 1 mm on their longest dimension and as small as 0.355 mm. Mason is focused on studying this last group.

Every piece of microplastic collected in 2012—there were thousands—was examined using a scanning electron microscope and energy-dispersive X-ray spectroscopy, Mason says. "This is some tedious work," she notes. Some of the tiny bits are jagged splinters from larger pieces of plastic. But most of them are spherical, suggesting that they were released into the environment as pellets, she says. What's more, many of them are the same size and color—including white, blue, green, or orange-red—as the small beads used in a number of personal care products, Mason says.

The analysis of the 2012 plastics collection in the lakes is described in a paper under review at *Marine Pollution Bulletin*.* According to Wilson, who is a coauthor, the paper would be the first to document plastic pellet pollution in the Great Lakes.

Of the plastics collected during the 2012 research cruises, about 80% of the pieces are less than 1 mm in size, Mason says. Although the amount in each sample varied widely in all lakes studied, the researchers estimated that they found a relatively low concentration of microplastics on Lake Superior, which has the least heavily settled watershed of the Great Lakes. The density of microplastics found on Lake Superior's surface averaged roughly 2,400 particles per km². At the other end of the spectrum, Lake Erie's surface had the highest density, averaging somewhere around 80,000 particles of microplastic per km². Lake Erie's watershed has the most people and industry of the Great Lakes and this could help account for its higher numbers of plastic particles, Mason says.

Circulation of water through the Great Lakes system could also be a factor in surface density of microplastic pieces, Mason points out. Water from Lakes Superior, Michigan, and Huron eventually moves through Lake Erie on the way to the Atlantic Ocean. This means that the plastics near the surface of those three lakes could move with the water as it makes its journey to the sea. Lake Erie drains via Niagara Falls into Lake Ontario, which empties into the St. Lawrence River, and that waterway flows into the Atlantic. Researchers collected plastics in Lake Ontario for the first time during summer 2013, and these pieces are undergoing scrutiny now.

The study of the 2012 samples did not include identifying the type of plastic or plastics in the beads, Mason says. But particles collected in the summer of 2013 in Lakes Erie, Ontario, and Michigan, in an effort funded by the Illinois-Indiana Sea Grant and the Burning River Foundation, will undergo analysis to determine their chemical compositions, she adds.

The discovery of microbeads in the Great Lakes has raised plenty of issues for further research. “I have a lot of questions I want to investigate,” Mason says, adding that she is collaborating with a number of other scientists to look for answers.

For instance, researchers are planning experiments to determine whether sewage treatment plants discharge tiny plastic spheres, Mason says. Specifically, she and her collaborators are preparing to study effluent samples from plants that discharge into Lakes Erie and Ontario to check for the presence of microplastics.

But at least one personal care product maker dismisses this possibility. In a statement on its microbead phaseout, J&J says, “To date, the science shows that microbeads from personal care cleansers are removed in wastewater treatment systems.”

J&J’s assertion is news to the National Association of Clean Water Agencies, which represents publicly owned sewage treatment plants. The association classifies the tiny plastic balls, which are designed to get washed into drainpipes, as an emerging contaminant, says Chris Hornback, senior director of regulatory affairs for the association. Emerging contaminants are materials entering wastewater, such as pharmaceuticals, that sewage treatment facilities are not designed to remove or break down.

Using technology developed in the 1950s and ‘60s, wastewater treatment plants rely mainly on gravity and microbes to eliminate biosolids and other waste products from water before it is disinfected and discharged into rivers or lakes, Hornback says. Mason points out that many treatment plants add flocculating agents to help remove solid materials from wastewater. But bits of plastic don’t tend to flocculate and thus aren’t likely to be captured during treatment, she says. Plastic microbeads tend to float and thus are likely to flow with treated wastewater into aquatic environments, Hornback tells C&EN.

In addition, other research is focused on whether the tiny plastic pellets skimmed from the surface are entering the food chain, Mason says. Scientists collected samples of lake fish during their research cruises this summer and will examine the contents of their stomachs for plastics.

Small fish and zooplankton could be feeding on microplastics because the particles are about the same size as their food. If these animals are ingesting the particles, the plastic could interfere with nutrient uptake or even physically clog their guts, Mason explains.

There is another concern too. Researchers are worried that persistent toxic substances found in the Great Lakes, such as polychlorinated biphenyls, can adsorb to the plastic and be released in the bodies of aquatic creatures that eat the tiny particles. The plastic could serve as a carrier for toxic substances to move into fish, then into those who eat them, including humans and birds, Mason says. Wilson points out that microbeads have a large surface area per volume, a trait exploited in laboratory equipment in which microbeads are used to separate materials or molecules. This could make the plastic spheres found in the Great Lakes efficient carriers of toxic pollutants, he says.

Looking at the issue of microbead contamination from a larger frame of reference, Wilson says that all plastic pollution in oceans and lakes is a problem. But the addition of tiny plastic spheres to personal care products designed to go down the drain and into the environment is “egregious,” he says. This reflects a lack of life-cycle analysis that is key to sustainability, he continues. Given this, environmental activists’ campaigns against the use of tiny spheres in personal care products have presented companies with “a pretty serious public relations nightmare,” Wilson asserts. “They recognize this is indefensible.”

Unilever announced its phaseout of tiny plastic spheres in personal care products under pressure from Plastic Soup Foundation, a Netherlands-based environmental group that seeks to curb the amount of plastic in the ocean. Unilever points out in its statement: “The amount of plastic in the marine environment thought to originate from the use of plastic scrub beads in personal care products is considered to be limited compared to other sources.” But given the growing amount and potential impact of these plastic bits, Unilever plans to complete its worldwide phaseout of microbeads by 2015. The company says it is “exploring which suitable alternatives can best match the sensory experience that the plastic scrub beads provide.”

Like Unilever, J&J puts its statement announcing a phaseout of polyethylene microbeads in the context of marine plastic pollution. “The likely sources of microplastics in the oceans are from the breakup of discarded plastic bottles and bags,” J&J says. Given consumers’ concerns, it says, “We want our beauty and baby care products to reflect consumers’ current and future needs so they will always have complete peace of mind when using our products.” The company says it is assessing the environmental safety of “a promising alternative” to the polyethylene spheres.



Microplastics on penny.
Photo courtesy 5 Gyres Institute. www.5gyres.org.

L'Oréal, a third company phasing out microbeads, owns The Body Shop, a brand of personal care products marketed as socially and environmentally conscious. Wilson says 5 Gyres found microbeads in The Body Shop items. L'Oréal asserts it "is committed to ensuring that all of our products have the best-in-class environmental profile" and conducts research on the impacts of its items on aquatic ecosystems. L'Oréal says it won't develop new products using polyethylene microbeads as exfoliants and "the company favors substituting them in its existing formulae whenever possible."

A P&G spokeswoman tells C&EN that her company will replace polyethylene micro-beads "as soon as alternatives are available and their suitability is absolutely certain." The company intends to phase out the beads globally over the next few years, with full elimination no later than 2017.

As these firms work to terminate their use of micro-beads, consumer pressure on companies to phase out the teeny plastic balls in personal care products is poised to grow worldwide.

Plastic Soup offers a smartphone app called "Beat the Microbead." With it, consumers can scan the bar code on a product and find out if it contains the tiny plastic spheres. The app relies on a database the group has assembled by purchasing dozens of personal care products and checking them for the presence of microbeads. Wilson points out that determining whether a product contains microbeads can be done easily by diluting the product and passing it through a coffee filter to capture any pellets.

The app was initially developed for the European market. Maria Westerbos, director of Plastic Soup, tells C&EN that the group will roll out an expanded, more global version of the free app in early October 2013.

Wilson's hope is that microplastic spheres intentionally added to personal care products will soon become a thing of the past. He says, "This is an instance of a poor design and a solvable problem."

To read the article online, visit <http://cen.acs.org/articles/91/i37/Microplastic-Beads-Pollute-Great-Lakes.html>.

*The paper, "Microplastic pollution in the surface waters of the Laurentian Great Lakes", has been published in the *Marine Pollution Bulletin* (Volume 77, Issues 1-2, 15 December 2013, Pages 177-182) and is available for purchase here: www.sciencedirect.com/science/article/pii/S0025326X13006097.

2013 WATERSHED STEWARDSHIP AWARD WINNERS

On February 25th, 2014, volunteers, students, and teachers gathered for our annual Watershed Stewardship Fair. Attendees had the opportunity to showcase their water protection efforts and meet others who share the passion for keeping our streams, lakes, and rivers healthy. We also celebrated the accomplishments of our local citizen scientists by giving three Cobb County Watershed Stewardship awards.

Pope High School – 2013 Watershed Stewardship School of the Year

We first met with Bill Blythe, a science teacher at Pope High School, in the spring of 2013 to discuss possible programs he could incorporate into a new Advanced Placement Environmental Science (APES) class to begin the following school year. Then, in August of 2013, we trained Mr. Blythe and the APES students in Adopt-A-Stream chemical monitoring. All of the students were interested in becoming certified and took the time to study in order to pass the QA/QC test, and the group began monitoring a week later.

Since becoming certified chemical monitors, the group has consistently collected quality water quality data. Not only do they conduct chemical monitoring more than once a month, with a total of 32 monitoring events in seven months, the group has adopted three sites on their campus. One site is on Piney Grove Creek, and the other two sites are located on a tributary of Piney Grove Creek, one above the school parking lot's stormwater outfall and the other below. As part of their yearlong Adopt-A-Stream project, the students are analyzing their data and comparing the water quality between the three sites.

In addition to participating in Adopt-A-Stream, several of the APES students are members of the Pope High School Horticulture Club. Inspired by their work in the APES class, the students organized a fall Rivers Alive cleanup and removed approximately 100 pounds of debris from the two campus streams. The students also discovered a *fish kill* during the cleanup and soon after notified the Watershed Stewardship Program. We then informed the appropriate monitoring unit of the Cobb County Water System. Representatives from the Water System immediately visited the site to collect samples and walk the stream. It was later determined that the fish kill was most likely caused by a water main break upstream from the cleanup site.

While this group has only been monitoring for seven months, they have the dedication and professionalism of seasoned monitors. We have truly enjoyed working with the group, and for these reasons, we are pleased to present Pope High School with the School of the Year award.



APES students monitoring on campus.

"It is exciting that we are able to contribute to a wonderful program, but ultimately this has been about students who have developed a deep concern for the waterways and in particular how our campus can be a bellwether for the local environment and contribute to the bigger picture downstream."

Bill Blythe, Pope HS APES Teacher



APES students Christopher Horacek and Teri Rakusin (middle) accepting award.

Ina Allison – 2013 Watershed Stewardship Volunteer of the Year



Ina Allison at Rottenwood Creek.

The Watershed Stewardship Program is honored to recognize Ina Allison as the 2013 Volunteer of the Year. Our team feels that she deserves recognition for her long-term and consistent volunteer efforts. She has been an Adopt-A-Stream QA/QC data collector since 2004 and has routinely maintained her certifications to ensure she remains QA/QC certified. She started with chemical monitoring in January of 2004 and added biological monitoring in March of the same year. When bacteria monitoring was offered in January 2009, she was in our first workshop. She has also attended the new visual monitoring training and has plans to add that to her data collection this year.

In ten years of monitoring, Ina has conducted 173 monitoring events at her site. It is important to note the location of Ina’s adoption site. She monitors in the Chattahoochee National Recreation Area on Rottenwood Creek, where the stream joins the river. From the parking lot, it is a twenty minute walk into the site. Her site was a deliberate choice to truly explore what is going into the river from this watershed. While friends sometimes join her, she often monitors solo.

In addition to collecting quality data, Ina helps organize and participates in several other Cobb County Watershed Stewardship activities. For Cobb’s River Rendezvous, she plays a key role in making the event successful, including visiting all thirty monitoring locations, updating the narrative directions for each site, helping promote and recruit participants, organizing the post-event lunch and making a super fruit salad, incubating and counting all bacteria plates, and sending Georgia Adopt-A-Stream the final data for posting on the database. In addition to her leadership behind the scenes, Ina also leads one of the ten monitoring teams during the event, often acting as a mentor to new participants. Ina also routinely contributes her time to our Rivers Alive efforts.

Ina’s commitment to water quality protection has been demonstrated repeatedly throughout the years. Our staff loves to work with her, and we appreciate the perspective she brings to our events and her commitment to environmental stewardship. Ina is truly deserving of the Volunteer of the Year award.



Mike Kahle of WSP presenting Ina with award.

Kennesaw State University School of Art and Design – 2013 Watershed Stewardship Partner of the Year

The partnership between the Kennesaw State University (KSU) College of Art and Design and the Watershed Stewardship Program began in 2002 with a t-shirt design contest. Over the years, we have worked with several professors at KSU, currently with David Short. We are now in our eighth year of holding the contest, and each year, students from the College of Art and Design submit artwork inspired by an environmental quote chosen by the Watershed Stewardship Program. Voting is open to the public, and the winner’s design is used on a Watershed Stewardship Program t-shirt.

Originally, the t-shirt design contest was presented to freshman and sophomores, but in the last two years, it has become a senior practicum. While beautiful designs have always been submitted, it is now a better overall contest. The seniors that participate in the project have a mastery of the software used to design and create the artwork, and their work is more conceptualized. As a result, each entry is professional, polished, and of a higher quality. This year, all of the students in the senior design class are required to participate in the t-shirt design contest. Students must treat the project as if they are working with a client in the professional world. This includes attending planning meetings with the Watershed Stewardship Program, researching and contacting t-shirt printers, pricing the shirts, and pitching their designs to us, the client.

Over the years, we have developed a mutually beneficial partnership. The students at KSU are participating in a real world project, gaining practical experience, learning the ins and outs of working with a government organization, and developing their portfolios. They are also using their skills to support the community endeavors of the volunteers, students, and teachers of Cobb County. In return, the Watershed Stewardship Program receives beautiful, high quality artwork. In addition to the t-shirts, the artwork submitted by students has also been used in our publications and on our website. Whenever student art is utilized, students are given credit and notified if their contact information is available. Also, the students are not relinquishing intellectual property, only giving us permission to use the piece. In addition to being used by the Watershed Stewardship Program, a contest entry last year was chosen by Rivers Alive, Georgia’s volunteer waterway cleanup program, for their annual t-shirt.

In April, the students will be pitching their designs to the Watershed Stewardship Program. The quote for this year’s contest is from Albert Einstein: “Look deep into nature, and then you will understand everything better.” Be on the lookout for this year’s contest; entries will be displayed at our office and on Facebook, and you can vote for your favorite in-person or online.

Over the years, we have seen many beautiful designs, and we continue to be impressed by the artwork submitted by the students. Not only do we enjoy working with the students and professors at KSU, but we are thrilled to be a part of a partnership that integrates art and science. We are honored to recognize the KSU School of Art and Design as the Partner of the Year.



David Short and students at Watershed Stewardship Fair.

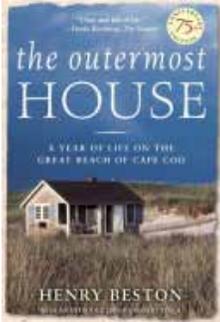
RECOMMENDED RESOURCE

The Outermost House: A Year of Life On The Great Beach of Cape Cod

by Henry Beston

"Beston's strength as a nature writer lies in his ability to reconnect us emotionally and imaginatively to the primal, natural sources of our being, to link us to a world larger and more enduring than what he calls 'our fantastic civilization.'"

Robert Finch, from the Forward to The Outermost House



A chronicle of a solitary year spent on a Cape Cod beach, The Outermost House has long been recognized as a classic of American nature writing. Henry Beston had originally planned to spend just two weeks in his seaside home, but was so possessed by the mysterious beauty of his surroundings that he found he "could not go."

Instead, he sat down to try and capture in words the wonders of the magical landscape he found himself in thrall to: the migrations of seabirds, the rhythms of the tide, the windblown dunes, and the scatter of stars in the changing summer sky. Beston argued that, "The world today is sick to its thin blood for the lack of elemental things, for fire before the hands, for water, for air, for the dear earth itself underfoot." Seventy-five years after they were first published, Beston's words are more true than ever.

Amazon.com

Have you ever seen a white rabbit in the wild? While it could possibly be an albino cottontail rabbit, most likely it is a domestic pet rabbit that has been abandoned to fend for itself. As Easter is approaching, pet shops and other places begin to sell bunnies. Yes, they are very cute, but did you know that these animals can live for 8-10 years, need to be spayed and neutered, should only live indoors, and are very high maintenance? A few months after Easter, rescue agencies are awash in bunnies given up by their owners who bought on impulse, and many end up euthanized. Others are just released into the wild, their owners not realizing they are domesticated rabbits from Europe. These animals have no idea how to survive on their own and are found in horrific shape. If you think you really want a pet rabbit, consider adopting one from the Georgia House Rabbit Society which is located right here in Cobb County. Not only do they have wonderful bunnies for adoption, but also provide classes on proper rabbit care: www.houserabbitga.com.

OBSERVATIONS



European rabbit: Photo by Rebekah D. Wallace, University of Georgia, www.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 Monitoring on Poplar Creek
- Butler Creek Kennesaw** - Chemical & Bacterial Monitoring in the Butler Watershed
- David Zandstra** - Chemical & Bacterial Monitoring on Rubes Creek
- Eric Lee** - Chemical Monitoring on Bishop Lake
- Friends of Victory Heights Subdivision Park** - Chemical Monitoring in the Rottenwood Watershed
- GA Lake Monitoring** - Chemical Monitoring on Lake Acworth
- Keep Smyrna Beautiful Adopt-A-Stream** - Chemical & Bacterial Monitoring in the Rottenwood Watershed
- McClesky Middle School** - Chemical & Biological Monitoring in the Rubes Watershed
- Pope High School** - Chemical Monitoring on Piney Grove Creek
- Sally Brooking** - Chemical Monitoring on Sope Creek
- Sedalia Park Target** - Chemical Monitoring on Sope Creek
- Sharon and Rick Donato** - Anuran Monitoring in the Rubes Watershed
- Sierra Club Cobb Centennial Group** - Chemical, Biological, & Bacterial Monitoring on Rottenwood Creek
- Village North Highlands Subdivision** - Chemical & Bacterial Monitoring in the Willeo Watershed

Thank you for heading out in our coldest months!

VOLUNTEER OPPORTUNITY

8th Annual River Rendezvous Saturday, May 10th, 2014 8:00am - 2:00pm Cobb County Water Quality Lab

The Watershed Stewardship Program and the 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 30 sites along Rottenwood Creek. Volunteers will collect samples for lab analysis, perform water quality testing and habitat surveys, and clean litter from the creek. At previous events, volunteers have been integral in finding and reporting active sewer leaks.

Afterwards, join us for a lunch cookout. 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!

Email water_rsvp@cobbcounty.org to register.

STEWARDSHIP SPOTLIGHT

Mableton Improvement Coalition

On a cold and windy day in mid-February, the Mableton Improvement Coalition (MIC) cleaned a section of Nickajack Creek between Discovery Parkway and the Chattahoochee River. Despite the weather, the group removed a significant haul of trash at the end of Nickajack Creek, where the creek meets the Chattahoochee River. During the Civil War, one side of the creek was the end of Johnston's River Line and the remaining Confederate trenches. A Federal artillery fort was located on the other side. This track of land is owned by Cobb County, and there are plans to create a park at the site. The cleanup event was organized as part of the MIC's efforts with Keep Cobb Beautiful. MIC also hosts an Adopt-A-Mile event each quarter.



We post twice weekly updates, workshop information, natural history tidbits, and more!



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

ECOPEDIA

Ootheca

An ootheca (plural oothecae) is an egg mass produced by several different groups of insects, most notably Praying mantids and cockroaches. Oothecae contain many eggs with a protective outer covering.

In the case of mantids the ootheca can contain several hundred eggs. When the young mantis nymphs emerge

Praying mantis ootheca in Watershed Stewardship office.



they hang down below the ootheca on a thread before splitting a sac-like covering and starting a free-living existence.

Source: www.amentsoc.org/insects/glossary/terms/ootheca

welcome

Seth Meador - Chemical Monitoring on John Ward Creek
Mitzy Gann - Chemical Monitoring on Butler Creek
Polk Street Crayfish - Chemical Monitoring on Ward Creek
Dragon Frogs - Anuran Monitoring on Noses Creek
Village North Highlands Subdivision - Anuran Monitoring in the Willeo Watershed



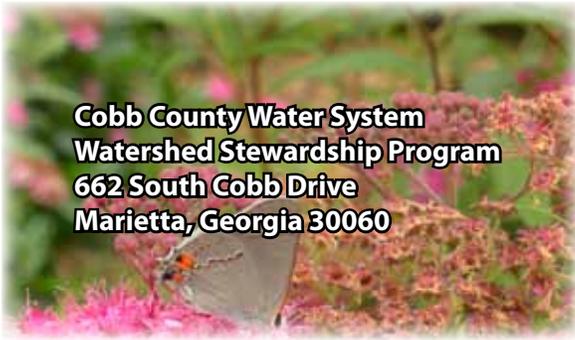
Nature

Nicole Rocheteau
Grade 2
Casa Montessori, Marietta, GA
Teacher: Hedwig O'Brien
Georgia River of Words
State Art Winner 2008

CONSERVATION TIP

Food Litter on Roadways

Littering campaigns have been very successful in reducing the amount of plastic, aluminum, glass, and paper pollution along our roadways. However, we often don't hesitate to throw out unwanted food from our vehicles, thinking that it will decompose over time. Before breaking down, though, it may lure a small animal out of hiding to investigate. This, in turn, attracts raptors such as hawks, eagles, and owls which often have to fly across the road to catch the prey that is eating a discarded apple core or banana peel. Wildlife rehab centers are inundated with injured raptors found by the side of the road, presumably struck by vehicles. To reduce the chances of these incredible birds being injured or killed, refrain from throwing any food items out of your vehicle. Wait and toss them in an appropriate waste receptacle, or even better, your compost pile.



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



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

- 3 Garden Work Day • 9:00am - 11:00am • Cobb County Water Quality Laboratory
- 8 Watershed "Privet Pull" Mob • 4:00pm - 6:00pm • Heritage Park
- 10 Garden Work Day • 9:00am - 11:00am • Cobb County Water Quality Laboratory
- 12 Sweep the Hooch • Chattahoochee River National Recreation Area • www.sweepthehooch.org
- 17 Garden Work Day • 9:00am - 11:00am • Cobb County Water Quality Laboratory
- 17 Adopt-A-Stream Chemical Monitoring Workshop • 6:00pm - 8:30pm • Cobb County Water Quality Laboratory
- 22 Earth Day
- 22 Rain Barrel Workshop • 10:00am - 11:00am • Cobb County Water Quality Laboratory
- 24 Garden Work Day • 9:00am - 11:00am • Cobb County Water Quality Laboratory
- 25-26 Cobb County Master Gardener Fair & Plant Sale • Jim Miller Park • Marietta, Georgia • www.cobbmastergardeners.com

May

- 1 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory
- 3 Storm Drain Marking Day • 9:00am - 12:00pm • Cobb County Water Quality Laboratory
- 6 Watershed "Cleanup" Mob • 4:00pm - 6:00pm • Fair Oaks Park
- 7 Rain Barrel Workshop • 2:00pm - 3:00pm • Cobb County Water Quality Laboratory
- 10 River Rendezvous • 8:00am - 2:00pm • Cobb County Water Quality Laboratory
- 14 Adopt-A-Stream Bacterial Monitoring Workshop • 6:00pm - 8:30pm • Cobb County Water Quality Laboratory
- 15 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory
- 22 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory
- 29 Summer Family Program • Amazing Eco-Race • 9:30am - 11:30am • Oregon Park • contact: Karen.Faucett@cobbcounty.org

June

- 4 Fizz, Boom, Read • Children's Summer Library Program • 3:30pm - 4:30pm • Kennesaw Branch Library
- 5 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory
- 9-11 Cool Waters Georgia Educator Water Workshop • 8:00am - 4:00pm • Johns Creek Environmental Campus • www.gawp.org
- 12 Garden Work Day • 8:30am - 10:30am • Cobb County Water Quality Laboratory
- 12 Rain Barrel Workshop • 2:00pm - 3:00pm • Cobb County Water Quality Laboratory
- 12 Adopt-A-Stream Chemical Monitoring Workshop • 6:00pm - 8:30pm • Cobb County Water Quality Laboratory
- 13 Summer Family Program • Creek Walk • 9:30am - 11:30am • Price Park • contact: Karen.Faucett@cobbcounty.org
- 17 Fizz, Boom, Read • Children's Summer Library Program • Kemp Memorial Library
- 18 Fizz, Boom, Read • Children's Summer Library Program • 3:30pm - 4:30pm • East Cobb Library
- 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

Events in GREEN are Cobb County Watershed Stewardship events.
More information can be found on our Calendar at www.cobbstreams.org.