Winter 2011

the Thalweg

Watershed Stewardship Program

Volume 8 ◦ Issue 1

Cobb County Watershed Stewardship Program

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Rivers Alive!

Is Alive and Kicking in Cobb County

Rivers Alive! is Georgia's annual waterway cleanup. Each fall, groups from across the state dedicate their time to improving their local bodies of water. There are numerous lake and river cleanups as well as coastal events. For over ten years, *Rivers Alive!* has brought together community members who share the goal of helping our environment.

In 2010, nearly 16,000 volunteers across the state logged over 37,000 hours cleaning up 1100 miles of waterways, collecting a whopping 832,000 pounds of garbage! That's a lot of plastic bags, soda bottles, and old tennis balls that are no longer littering our streams.

In Cobb County, there were several groups who participated in 2010 *Rivers Alive!* events. We want to recognize them for their hard work.

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  5th graders from The Walker School cleaned sites on Noses Creek and the Chattahoochee River and seperated their findings into trash and recycling.

- 25 volunteers from Mabry Middle School's Environmental Club collected 20 lbs of garbage from a tributary of Rubes Creek.
- The Chestnut Hill Subdivision removed 75 lbs of trash from 10 miles of their neighborhood stream.
- 3rd grade Target students from Tritt Elementary School cleaned up a tributary of Willeo Creek.
- 3rd grade Target students from Keheley Elementary School cleaned up Rubes Creek.
- The Sierra Club Cobb Centennial Group cleaned up sites on Rottenwood Creek at Life University.
- Carolyn Pusey-Wade and 67 volunteers from Cooper Middle School and Clarkdale Elementary School cleaned over 600 lbs of trash from Olley Creek.
- Eric Lee cleaned up sites in his neighborhood on Bishop Lake.

Thank you for your dedication to our environment!

THE ROLE OF RIPARIAN VEGETATION IN PROTECTING AND IMPROVING CHEMICAL WATER QUALITY IN STREAMS

Michael G. Dosskey, Philippe Vidon, Noel P. Gurwick, Craig J. Allan, Tim P. Duval, and Richard Lowrance

Riparian vegetation influences stream water chemistry through processes including direct chemical uptake and indirect influences such as by supply of organic matter to soils and channels, modification of water movement, and stabilization of soil. Through the collective action of many processes, vegetation exerts substantial influence over the effect that riparian zones have on stream water quality. However, the degree to which stream water quality can be managed through the management of riparian vegetation remains to be clarified. An understanding of the underlying processes is important for effectively using vegetation condition as an indicator of water quality protection and for accurately gauging prospects for water quality improvement through restoration of permanent vegetation.

RIPARIAN VEGETATION-WATER INTERACTION

Riparian zones are lands adjacent to streams and shorelines, and through which overland and subsurface flow paths connect waterways with runoff from uplands. They typically occupy a small fraction of the landscape, but they often play a disproportionately important role in controlling water and chemical exchange between surrounding lands and stream systems. Overland runoff is generated when infiltration is limited by low soil permeability or its saturation. Subsurface flow occurs where infiltrated water accumulates in and saturates the subsoil and then flows laterally toward streams in response to water table gradients. Subsurface flow is more rapid through layers of relatively coarse, permeable strata, but subsurface flow is still much slower than overland flow.

Aboveground vegetation and surface litter interact directly with precipitation, surface runoff, and flood waters in riparian zones. Root systems interact with soil water and with groundwater that is shallow enough for roots to reach. Roots generally do not grow far below a water table due to lack of oxygen supply to their living tissues, so significant root interaction with groundwater probably is limited to the upper groundwater layer. Plant debris from riparian vegetation is a major source of organic matter to stream channels, particularly to headwater streams. Tree stems, root wads, and large branches lodge in channels and provide roughness to the channel bed and bank toe slopes that slows stream velocity and promotes stability and deposition.

PROCESSES INVOLVING RIPARIAN VEGETATION

Plant uptake is an important process in the fate of many organic pesticides which are subsequently transformed and degraded within plant tissues. The decay of plant detritus produces soil organic matter that has enormous influence on chemical transport and transformations in soils. Many synthetic organic chemicals, such as agricultural pesticides and endocrine disruptors, bind strongly to and are immobilized by soil organic matter and are subject to degradation by heterotrophic microbes that decompose plant litter.

Vegetation also affects the transport of chemicals by mediating water flow and distribution in riparian zones. Plant stems and litter at the ground surface create roughness that retards overland flow and increases concentration time for water to infiltrate the soil. The action of root growth and decay and of burrowing by macroinvertebrates grazing on roots and litter increase the permeability of the soil by creating large pores through which water can easily flow. Infiltration reduces runoff volume and its physical capacity to carry sediment, so excess sediment deposits on the ground surface. The deposited sediments eventually become overgrown by vegetation and the associated chemicals become part of the root zone pool and subject to soil biogeochemical processes.

INFLUENCE OF VEGETATION TYPE

As plants vary widely in size, form, growth rate, longevity, and litter quality, their influences on stream water chemistry may range widely as well. Woody plants generally are much larger, taller, longer-lived, and their stems grow more widely spaced than herbaceous plants, and, woody litter generally decomposes more slowly than herbaceous litter. While herbaceous vegetation can effectively protect and stabilize surface soils from scouring erosion by overland flow and floods, woody plants may be better for stabilizing high, steep banks from mass failure. Along unstable streams, woody plants have been observed to be more effective than herbaceous vegetation at reducing high bank erosion rates. However, a mix of woody and herbaceous vegetation has been suggested to provide the best overall capability for bank stabilization.

Trees have been associated with both lesser and greater chemical processing activity in stream channels than herbaceous vegetation.

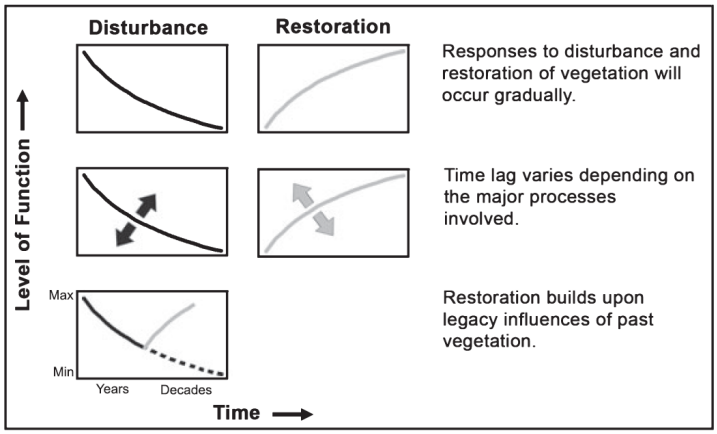
Forest shade can suppress algal growth and its uptake of inorganic nutrients and reduce photolysis of organic chemicals in small streams. However, riparian forest may compensate for shading effects by promoting a greater reactive channel surface area (wider channel) and greater organic matter contributions that fuel microbial and chemical processing in streams.

WATER QUALITY RESPONSE TO RESTORATION OF RIPARIAN VEGETATION

Major conservation programs in the U.S., such as the Conservation Reserve Program and the Environmental Quality Incentives Program, have promoted the conversion of cleared riparian farmland to permanent vegetation to, in part, reduce the load of chemicals and sediments in streams. An understanding of the full range of influences by which vegetation affects water chemistry is important for properly assessing prospects for water quality improvement. The response to restoration of vegetation is determined to a large extent by how much degradation of the original vegetation-related processes has occurred following clearing of the riparian zone. Restoration, then, builds upon whatever components and processes remain.

The overall response of stream water chemistry to removal of riparian vegetation accrues as a cumulative response by many individual processes. When vegetation is removed, some individual processes are immediately disrupted while others continue to function normally for a time. Time lags will dampen the immediate impact of vegetation removal on stream chemistry and substantially delay its ultimate level of degradation. Very long time frames may be necessary for the effects of vegetation removal to become fully manifested. For restoration, the time frame and potential level of water quality response will depend on how much degradation occurred following clearing of the riparian zone as well as on how quickly restoration of live vegetation can restore the effective components and processes. For situations where the degradation is relatively mild, such as the removal of live vegetation for only a few years, overall water quality response to vegetation restoration will likely be relatively small and quick. In contrast, stream sediment loads may respond substantially and quickly to riparian restoration. For more extreme circumstances, such as longer periods of absent vegetation and loss of surface litter and channel debris, there will be relatively greater potential for improvement, but it may take much longer to achieve.

The potential for complex and dynamic water quality response to riparian restoration was demonstrated in a long-term study of a pasture having a trampled and overgrazed riparian zone that was subsequently fenced off from livestock. It was observed that rapid herbaceous regrowth, including aquatic macrophytes, during the initial five years stabilized the bank and channel bed and stream nutrient levels declined. Between 5 and 12 years, woody vegetation became established, stream blockages by debris became common, and nutrient levels declined further. From 13 to 17 years, debris blockages became less common, aquatic macrophytes became shaded out, and nutrient levels increased. The authors speculated that there would be a further 10 years of change until stable forest vegetation conditions prevailed. The water quality response was uneven over that time frame, characterized by rapid initial improvement, which slowed, and then reversed as various vegetation-mediated processes manifested themselves at different times. For water managers, this suggests that a high and stable water quality function of restored vegetation may take many years to achieve.



A biogeochemically resilient system in which processes recover to preexisting levels. In less resilient cases, restoration will not mirror the trajectory of disturbance and full recovery of function will not occur.

CONCLUSIONS

Riparian vegetation influences stream water quality in many ways, from direct chemical uptake and cycling by live plants to indirect influences of plant detritus on soil and channel chemistry, water movement, and erosion. These influences are exerted both within the riparian zone and in adjacent stream channels. While vegetation plays an important role, it remains uncertain how much the chemical quality of stream water can be managed through selection of the type of riparian vegetation.

Our analysis suggests that the level and time frame of water quality improvement depends on the type of pollutant and the processes that act on it, site conditions that determine how important each process is, and the amount of degradation in these processes that occurred prior to restoration. Legacy effects of past vegetation can continue to influence water quality for many years or decades and control the potential level and timing of water quality improvement. An understanding of these underlying processes is important for effectively using vegetation condition as an indicator of water quality protection and for accurately gauging prospects for water quality improvement through restoration of permanent vegetation.

This is an abbreviated version of the full article, which was originally published in the April 2010 issue (Volume 46, Number 2) of the Journal Of The American Water Resources Association.

Garden for Winter Wildlife by Providing the Essential Elements for Survival

Food

Plant natives that will provide berries or seeds in the winter. Instead of cutting back perennials, leave them for birds who enjoy dining on the seeds.

Berry producers: chokeberry, viburnums, american beautyberry, hackberry, holly, sumac, bayberry
Seed producers: hyssop, river oats, blackeyed Susan, coneflower

Water

Southern winters are usually not cold enough to freeze natural sources of water, but it still helps to provide water in your garden. Birdbaths not only provide water for drinking, they also help keep feathers clean which improves heat insulation. If you have a pond, you can float tennis balls on the surface to keep it from freezing. This will also provide oxygen to the slumbering amphibians in the muddy bottom.

Shelter

Provide cover for the animals in your garden.

- A pile of logs for reptiles, amphibians, wood mice, wrens and even foxes.
- A pile of rocks and stones for amphibians. You can also dig shallow holes, about 3in deep, and cover almost completely with paving slabs. Locate these shelters near a pond if possiblle.
- A loose pile of tree leaves, grass clippings or straw for reptiles, amphibians, wood mice and shrews.
- A sheet of corrugated iron - the 'tunnels' are ideal for reptiles, amphibians, wood mice and voles.
- A bundle of bamboo or sunflower stalks - tie these together and place in a dry area of the garden as 'cube homes' for insects.
- Compost heap - aside from recycling plant 'waste' and providing excellent compost, the heap is a great winter habitat for wildlife. Be careful when turning it!
- Nooks and crannies, such as inside sheds, garages, under the bark of logs, and cracks in door frames are excellent overwinter homes for insects. Avoid cleaning or painting these areas until spring when the insects have had a chance to emerge.

One last thing!

Leave tilling to the earthworms. Excessive tilling can destroy millions of organisms, air pockets, and soil structure. Don't rake leaves because they provide cover for animals over winter. They are also "food" for beetles, centipedes, and pillbugs, providing nutrients to your soil. Let dead flowers decompose naturally instead of cleaning out your beds. Basically, resist the urge to be too tidy in the garden, and let nature take its course.

Suet Recipe

2 cups	unsalted lard
1 cup	crunchy peanut butter
2 cups	yellow corn meal
1 cup	raw oatmeal
2 cups	birdseed
1 cup	chopped dried fruit

Melt the lard in a pan on low heat.
Add the peanut butter, mix well.
Add dry ingredients.
Pour into a cake pan and let cool.
Cut the suet, place it in a onion bag. Hang from a tree branch.

Photoperiodism

The winter solstice marks an important moment in the life cycle of plants. Many flowering plant species respond to changes in the duration of night - called photoperiod. The mechanism behind the hormonal response is governed by the number of hours of darkness (not daylight) over a period of 24 hours.

Photoperiodic species are classified as long-day or short-day plants. Poinsettia is a common example of short-day plants; it requires long night to produce its small yellow flowers and to develop the bright colors of its bracts (specialized leaves).

Others, such as cucumbers, tomatoes and roses, are not sensitive to photoperiodism. They get the cue to bloom from temperature, or at a certain development stage.

Tasty Landscape Decorations

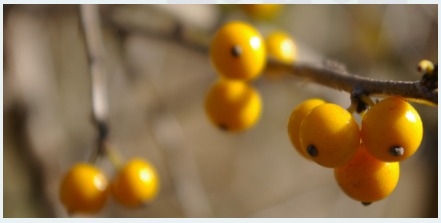
Garlands:
- Popcorn & fresh cranberries
- Unsalted peanuts in the shell

Ornaments:
- Dried corn on the cob
- Mixed nuts
- Pinecones or rice cakes covered with crunchy peanut butter, cornmeal, & birdseed

Maintaining excitment in the garden during the colder months is challenging. Here are some of our favorite winter interest plants.

Redtwig dogwood, Baileyi cultivar (*Cornus sericea 'Baileyi'*)
This upright colonizing shrub is one of the most striking features of our garden in the late fall. The blood-colored stems lose their luster after 2 years of age; thin and prune regularly to promote suckering and rejuvenate colors. The rather small flowers come out early before the leaves, like pompoms at the end of the stems. They grow on the previous year's wood and produce white berries (*alba* means "white" in Latin).

Possum haw, Finch's Gold cultivar (*Ilex decidua 'Finch's Gold'*)
As the botanical name suggests (decidua), the possum haw goes bald in the fall. The dense foliage leaves the stage to a delicate silver gray structure for the winter. Our Finch's Gold possum haw, planted only a few years ago, displays nice yellow berries (the species carries red ones). The production will increase as the shrub establishes. The berries persist until they are eaten by birds and small mammals, after being exposed to frost.



'Twisty Baby' contorted black locust (*Robinia pseudoacacia 'Lacy Lady'*)
The contorted black locust is an excellent focal point in the winter garden, its silhouette standing against a bright sky. Its branches follow a zigzagging habit, changing direction at every node. 'Lacy Lady' is a cultivar introduced in the mid-1990's, commercially sold under the name 'Twisty Baby'. The species produces fragrant blooms in late spring, but the cultivar does not always. Its delicate compound leaves to creates a constantly moving dapple shade.

Winter honeysuckle (*Lonicera fragrantissima)*
The abundant flowers of the winter honeysuckle are not showy, but very fragrant. The cream colored blooms stay open for several weeks in late winter/early spring and turn into red berries in early summer. Twigs can be incorporated into floral arrangements to enjoy the lemony scent indoors. Its nerly evergreen foliage exhibits a hint of blue and develop up a light yellow hue in the winter.

welcome

new watershed stewards

Mike Kahle
will be monitoring a tributary
of Allatoona Creek

Girl Scout Troop 2910
will be monitoring Sewell Mill Creek

Lassiter High Sschool APES Class
will be monitoring Rubes Creek

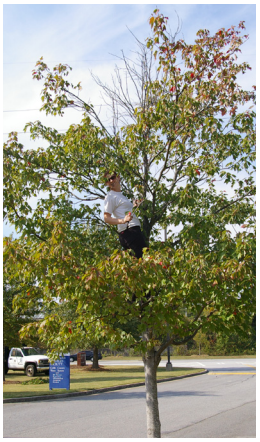
Keep Smyrna Beautiful
will be monitoring four sites
in the Rottenwood Creek watershed

The Gleichweit Family
marked storm drains in the
Falcon Woods Subdivision

Dale Moller
will be marking storm drains in the
Misty Forest Subdivision

Goodbye and Good Luck to Catherine Mercier-Baggett

In 2009, Catherine Mercier-Baggett joined our group as an Environmental Programs A ssistant. We were excited to welcome her to our team since she brought an in-depth knowledge of science and ecology, as well as a background in planning and design. Catherine quickly proved us right by jumping into our school outreach programs and volunteer initiatives. In addition to teaching students about topics as far ranging as snakes to pollution to ecoregions, she also took over our storm drain marking initiative. In addition, she took the reins for middle and high school programs, designing and implementing programs geared for more advanced students.



Always the photographer and rarely the subject, we nevertheless managed to catch Catherine up a tree during a pruning workshop.

Catherine's biggest project during her time with us was undoubtably the revitilization of our rain and wildlife garden. Using her background in landscape architecture, she developed a plan for a new and improved garden that will be unveiled in Spring 2011 as a focal point for community education in native species, stormwater control, and wildife. However, she didn't just plan behind the scenes. Many sunny (and not so sunny) days would find Catherine in the garden weeding, planting, and pruning.

Catherine will be ringing in 2011 in her new position as Urban Planner for Rockdale County. While we are incredibly sad to see her leave, we are happy to see her moving forward. Catherine - Thank you for all of your hard work, and we wish you the best of luck in the future!!

Watershed Stewardship Fair

March 2, 2011

Cobb's annual Watershed Stewardship Fair is a data sharing event that showcases volunteer stream projects. Originally designed to showcase Cobb's Adopt-A-Stream volunteers, we have exapanded the event to include our anuran monitors, storm drain markers, and school groups who have participated in a stewardship activity. Participants are encouraged to share their stream observations and project goals with the community. Each group is invited to create a poster displaying their water quality conservation efforts.

We give each watershed stewardship group a few minutes to relate success stories and share concerns and frustrations with a like-minded audience. This is your opportunity to learn from and support other Cobb County volunteers. Representatives from Georgia Adopt-A-Stream, Department of Natural Resources Environmental Protection Division, Master Gardeners, and local riverkeepers will be invited to attend so that our volunteers have an opportunity to voice their concerns with state and federal regulators as well as advocacy groups.

In addition to a fun evening of education and mingling, tours will be conducted for those who are interested in the day to day workings of the Cobb County Water Quality Laboratory. Join our chemists and biologists as they explain how the lab tests water from Cobb's four wastewater treatment plants to ensure that it is safe to release back into our environment. The tour is great for all ages. In the past, families as well as elementary through high school students participated.

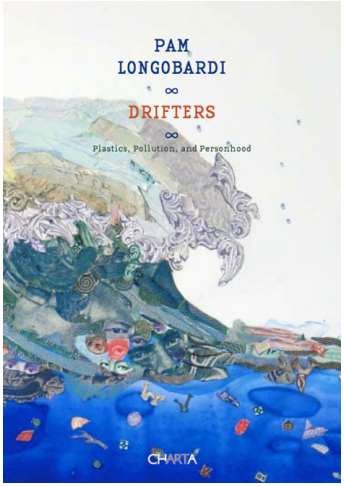
Join us on March 2, 2011 to visit the lab, meet fellow volunteers, and speak to environmental professionals. Drinks and refreshments will be provided. We hope to see you there!

If you would like to attend the Watershed Stewardship Fair, please contact us at 770-528-1482 or email water_rsvp@cobbcounty.org.

RECOMMENDED RESOURCE

Drifters by Pam Longobardi

Local professor Pam Longobardi took on a big subject and produced heartbreakingly poignant body of work involving ocean debris. A Professor of Art at Georgia State University in Atlanta, Longobardi is an active artist with exhibitions around the world.



"I see the debris as a portrait of global late-capitalist consumer society," says Longobardi. "The plastic elements at first seem attractive and innocuous, like toys, some with an eerie familiarity and some totally alien. [Initially], the plastic seems innocent and fun, but it is not. It is dangerous." Longobardi's work combines painting, drawing, prints and installation in an ongoing examination of the psychological relationship between humans and the natural world.

"I believe that conservation can have an influential voice in the arts, also that the arts can influence our future. Art is a visual language. There are many thoughtful and creative artists who are concerned with the environment and dealing with it in powerful visual statements and projects."

From www.blueocean.org

observations

If you move a log or stone this winter, you may discover a small lizard, the Green Anole, hibernating. Why is this reptile brown this time of year if it is called "green"? Green Anoles can change colors depending on their activity level (not to match their surroundings like true chameleons). When cold and sluggish, these lizards usually will be brown. However, on warm winter days, Green Anoles may move around and bask in the sun, in which case they probably will be green in color. This common lizard is great for natural pest-control in your yard since they eat lots of bugs and spiders!

Linda May, Environmental Outreach Coordinator
Georgia DNR, Wildlife Resources Division

ECOPEDIA

Land Use - Destructive land use impacts derive from our tendency to view the land solely in economic terms, as an expendable resource. This is only a temporary strategy, only feasible during the current period of cheap fossil fuel. In time, we will have to adopt land use policies for sustainibility. Moreover, preserving some areas as wilderness will enable to remember how astoundingly beautiful the land is when we do not interfere with it.

From Ecology: A Pocket Guide

CONSERVATION TIP

This year when you travel for the holidays, unplug your appliances. Residential consumers in the U.S. spend more than $5 billion annually on standby power alone - about 5 percent of all electricity consumed in the country.

From The Green Book

REMINDERS

- RSVP for the Watershed Stewardship Fair by February 21!
- Adopt-A-Stream and Anuran Monitoring Volunteers: Please submit your data in the same month in which it was collected. This ensures that we are correctly counting your volunteer hours as we submit our monthly reports.
- Keep up with our latest events and photos on our Facebook page! Search for "Cobb County Watershed Stewardship".

Cobb County
Watershed Stewardship Program
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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

January

20 AAS Chemical Monitoring Workshop (Recertifications Only!) ◦ 6pm - 8pm ◦ Water Quality Lab
27 Household Hazardous Waste/Fats, Oil, & Grease Workshop ◦ 6:30pm - 8pm ◦ Water Quality Lab

February

8 AAS Chemical Monitoring Workshop ◦ 6pm - 8:30pm ◦ Water Quality Lab
22 & 24 Our Shared Forests & Native Waters Curriculum Workshops ◦ 3:30pm - 8:30pm ◦ Water Quality Lab
23 AAS Bacteria Monitoring Workshop ◦ 6pm - 8pm ◦ Water Quality Lab
26 AAS Biological Monitoring Workshop ◦ 9am - 2pm ◦ Water Quality Lab

March

2 Watershed Stewardship Fair ◦ 6:30pm - 9pm ◦ Water Quality Lab
12 Environmental Education Alliance of Georgia Annual Conference ◦ Kennesaw State University
26 Adopt-A-Stream Annual Confluence ◦ Stone Mountain Park

April

14 Anuran Monitoring Workshop ◦ 7pm - 9pm ◦ Cato Park

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