



Protecting our Waters and our Land for more than 30 Years

Will the Great Swamp Ark Stay Afloat?

By Emile DeVito, Ph.D.

Fifty-four years ago, Helen Fenske and her comrades successfully fought off the NY/NJ Port Authority, saving Great Swamp from a transit planner's nightmare of a development proposal. But the battle didn't end. The next generation of conservationists always knew they would have to "Save Great Swamp Again," and again, especially from pollution due to incessant suburban sprawl.

Suburbanites fight to maintain an outdoor "plastic-slipcover" look, as if their yards were an extension of their living

rooms! The Great Swamp Watershed Association tries to change the viewpoint of swamp neighbors, who have been led to believe that it's good to harness nature by dumping nutrients and biocides on everything.

Back in the early 1960s, not even the pioneers of the Rutgers ecology tradition envisioned that our preserved lands, and all of our biologically-diverse native ecosystems in general, would be under such endless assault from over-abundant deer, invasive alien plants, insects, pathogens, atmospheric deposition of acids and heavy metals, and climate change.

Thank goodness that the Great Swamp was put into the hands of the U.S. Fish and Wildlife Service (USFWS)! They recognized in the 1970s that suburban deer were a threat to the integrity of the refuge, and they acted. Amidst great controversy, they began a hunting program long

(continued on page 9)



The Great Swamp in all its natural glory. Photo by A. Kaufman.

From the Desk of the Executive Director



by Sally Rubin

I'd like to take this opportunity to talk about gratitude. It's so easy to get caught up in the stress of our lives and forget to be grateful for what we have. If you know me, you know my mantra is "my husband loves me and my kids are healthy." At least in my book, those are probably the two most important things for which to be grateful. But there are other things we should be grateful for too. Appreciate the roof over our heads, the heat in the winter, and the air conditioning in the summer. Appreciate the abundance of food in our grocery stores, and the restaurants we frequent, and the fact that our bellies have never gone hungry. Be grateful for our democracy and the relatively peaceful times in which we live. But you all know this and think about it, whether those thoughts are conscious or unconscious. Here's one you probably don't think about though: Be grateful for not needing to give a second thought about the uncontaminated and plentiful water that comes out of your tap.

Did you know that almost one billion people in the world don't have access to safe drinking water? That's almost 15% of the world's population. And, over two billion people lack adequate sanitation. As we know, there is a finite quantity of water on our planet. Although more than 70% of the earth's surface is covered in water, only 2.5% of it is fresh, and more than 75% of that

fresh water is frozen in ice caps and glaciers. While that still leaves a lot of water available for us, it's more limited than we think. As populations grow and demands on water supplies increase, pollution levels rise and our access to good clean water quickly slips away.

As we know, climate change impacts water availability too. Rain and snow replenish our reservoirs and streams, and eventually percolate down to replenish groundwater aquifers, which we subsequently use up before they can be refilled. Because the climate change phenomenon has produced flooding and droughts, some regions have too much water and other areas don't have enough. While the overall volume of water on earth doesn't change, it's not always there where we need it or when we need it.

Beyond the issue of water scarcity is the problem of infrastructure. Here in New Jersey, we use one trillion gallons of water each year. I'm no math major, but I think that's 12 zeros. That's a lot of water and it all flows through pipes—some of which are more than a century old. My guess is that no one ever intended those pipes to last more than 100 years, nor did anyone install them with the knowledge that so much water would routinely pump through them. It's hard to think about repairing and upgrading our infrastructure, especially when we don't see it. But it must be done.

I will leave you with one last thought. Where does your water go when you run your washing machine, or take your shower, or flush your toilet? Okay, you're right. It goes to a sewer treatment facility. Where does it go when it leaves that facility? It goes back into a river. Now, where does the water come from when you turn on your tap at home? It comes from a water treatment facility. And where do they get the water to process and send to your tap? Yup, you guessed it; the same river that sewer treatment facility pumped its water into 48 to 72 hours ago. So, in other words, the next time you turn on your tap, you might be about to drink the same water you washed your clothes in two or three days ago. And that's okay! In fact, it's great because the water at your tap, regardless of where it's been, is potable and plentiful.

The lesson here is obvious. Be grateful for our clean and abundant supply of water. Do not take it for granted. Help us protect both the quality and quantity of our water. Know where your water comes from and where it is going. 

Know Someone Who Would Like to Become a Member?

GSWA relies on members like you to help protect our watershed's natural resources. So please pass this newsletter along, and encourage your friends and neighbors to join us! Visit www.GreatSwamp.org for more information.

ACROSS THE WATERSHED

is a publication of the **Great Swamp Watershed Association**.

GSWA is a member-supported non-profit organization that has been protecting our waters and our land for more than 30 years.

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Watershed Watch – Environmental Hot Spots

by Sally Rubin, GSWA Executive Director

The “environmental hot spots” described below outline some of GSWA’s advocacy activities throughout the Great Swamp Watershed over recent months. Where appropriate, we continue to closely monitor each situation. We rely on you, our friends and supporters, to keep us informed of pending development issues in your town.

Harding Township: Primrose Farm Estates

GSWA has worked for more than three years to facilitate the preservation of more than 115 acres of environmentally sensitive land in Harding. Last winter, we applied for a Green Acres grant to assist with funding for this project. We continue to wait for a decision on our application and remain hopeful that the property will be preserved by year’s end.

Primrose Farms is one of the last large tracts of open space remaining in Harding. The site features wetlands, mature forest, open fields, steep slopes, and endangered species habitat. We have been working with Harding Land Trust and the Trust for Public Land on this preservation project. When the preservation process is completed and Harding Land Trust owns the property, the land will be available for passive recreation opportunities, including hiking, birding, equestrian activities, and cross country skiing. GSWA and Harding Land Trust will collaborate to offer educational programming at the site.

Harding Township: Cell Tower

There is an application before the Harding Board of Adjustment to construct

a cell tower at the corner of Tempe Wick Road and Route 202 on property owned by the local Seventh-day Adventist Church. The proposed construction site is within 250 feet of Primrose Brook, the only stream within our watershed to receive New Jersey’s C-1 designation for water quality protection. The C-1 designation was designed to prevent any measurable deterioration in existing water quality from occurring.

GSWA does not oppose construction of the new tower, but we do advocate in favor of placing it in a location that is less environmentally detrimental to Primrose Brook. One possible alternative site already exists closer to Route 287, on land owned by the State Department of Transportation. That alternate location stands hundreds of feet further away from Primrose Brook and would be better suited to accommodate the project.

Hearings on this issue have been postponed for several months, and we await our opportunity to make our comments in public.

Long Hill Township: Copper Springs

Indoor Soccer, LLC, is discussing a zoning change for this site located on New Vernon Road near Meyersville Road. The site sits immediately adjacent to the Great Swamp National Wildlife Refuge.

The proposed rezoning plan would move the property out of the Township’s Conservation Zone and place it in a newly defined Commercial Recreation Zone. It also would allow the applicant to increase impervious coverage on the site from 15% to 40%. These changes would permit additional

land development on the site, including construction of several new recreation bubbles. The proposed construction includes a plan to fill in a large pond that already exists at the site. GSWA believes that the pond is fed by a natural spring, and that its destruction or impairment would degrade and increase stormwater runoff into Great Swamp.

GSWA is closely following the proposal process in Long Hill and may actively participate in the application process if and when it begins.

Chatham Township: Steep Slopes Ordinance

In June, Chatham Township modified its steep slopes ordinance, making it much less stringent. The change allows owners to disturb up to 500 feet of steep slope on their property without seeking approval from the local planning board. We opposed this proposal because of its potential for increasing stormwater runoff and erosion.

Bernardsville Borough: Chase Bank

In July, the Bernardsville Borough Planning Board approved the development of a new Chase Bank building on Route 202 just south of Bernardsville Centre. At GSWA's request, final approval of the development plan included the addition of more drainage on site to reduce and retain stormwater runoff. Drainage from the proposed site flows into nearby Penns Brook, which is already impaired by erosion and sedimentation from poor stormwater management at other sites in the area.

GSWA has worked steadily over the last several years to improve stormwater management practices at each development site impacting Penns Brook in Bernardsville, including the Bernards High School turf field, the Shop Rite parking lot addition, and the Bernardsville Centre expansion.

Loantaka Brook Reservation: Seaton Hackney Stables

GSWA has entered the planning stage for remediation of severe water pollution on Loantaka Brook caused by animal waste discharge from nearby Seaton Hackney Stables. Current activities at the site include development of a draft Conservation Activities Plan.

Two years ago, when our water quality testing program showed high levels of *E. coli* bacteria, GSWA applied for and received a \$300,000 NJDEP 319 grant to design and implement remediation projects in partnership with the Morris County Park Commission, Princeton Hydro (our environmental stormwater consultants), Rutgers Equine Science Center, and the stable vendor. A portion of the remediation work will be accomplished under a wetlands mitigation agreement with PSEG and should begin this fall. This first phase will include relocating the miniature ponies away from Loantaka Brook to a more appropriate location and creating a 50-foot native plant buffer along its bank. Ultimately, there will be an education component to help residents with horses on their properties be good stewards of the land and water. 

Outdoor Programs

Learn more about what's happening in and around the Great Swamp Watershed region by joining us for one of our upcoming outdoor events. These programs are fun and informative for people of all ages and skill levels.

Registration is requested for all outdoor programming. Please read the following event descriptions for specific registration information. In most cases, current GSWA members participate free of charge. Non-members are asked to make a voluntary contribution of \$10/adult and \$5 per child (6 to 17 years), or \$35/family (includes 4). There is no suggested contribution amount for children ages 5 and under. Please refer to the descriptions below for event-specific exceptions.

When attending an outdoor program, please dress for the weather. Conditions may be wet, muddy, hot, or cold. Long pants and sturdy shoes or boots are strongly recommended. Feel free to bring your own water in a reusable water bottle, and your own snacks. Binoculars and field guides are welcome where conditions permit use.

Event dates, times, and locations are subject to change or cancellation. If an email address or phone number is provided at time of registration, GSWA will make every effort to inform pre-registered participants about scheduling changes. Updated scheduling information is also available by calling our Event Information Hotline at 973-538-3500 x22.

Jockey Hollow Explorers: Nature Hike and Storytelling Campfire Friday, September 21, 7–9 p.m.

Jockey Hollow Visitor Center, 6 Jockey Hollow Rd., Morristown, NJ

The Jockey Hollow section of Morristown National Historical Park teems with wildlife and national heritage. Enjoy an early fall hike and some storytelling as you learn more about the natural and cultural history of the site. Start the evening with a gentle, guided hike through the park's natural sights and sounds courtesy of the Great Swamp Watershed Association. Along the way, keep an eye out for fireflies, listen for owls, and watch for katydids and other wildlife! After the hike, join a National Park Service interpreter around a campfire for some storytelling and history. Learn why George Washington thought Jockey Hollow was perfect for his army encampment in 1779, and how the surrounding landscape might have looked two hundred thirty-three years ago!

Families and children are encouraged to attend. Space is limited. Register online at www.GreatSwamp.org to reserve your space right now! There is no registration fee associated with this event; however, voluntary donations to the Great Swamp Watershed Association are gratefully accepted. Suggested donations: None for GSWA members and their families; \$10 per non-member adult (18+), \$5 per non-member child (6-17 years), or \$35 per non-member family (includes 4). There is no suggested donation amount for children 5 years and under.

**Early Fall Plant and Wildflower
Identification Walk
Sunday, October 7, 10 a.m.—noon**

*GSWA Conservation Management Area, 1
Tiger Lily Ln., Morristown, NJ*

Join GSWA's Land Steward and Director of Education and Outreach Hazel England for a morning stroll through GSWA's 53-acre Conservation Management Area (CMA) in Harding Township. As you journey through the forest, along streams, and over wetland boardwalks, Hazel will use her expert knowledge of the local environment to teach you how to identify some of the native and non-native plants and wildflowers that make their home in the Great Swamp Watershed region. We'll also keep a close eye out for wildlife, including frogs, chipmunks, wood ducks, and other birds. Bring along a post-walk lunch and enjoy the new picnic area recently installed near the CMA's entrance gate. What a great way to celebrate the early fall weather! Space is limited. Visit www.GreatSwamp.org to register and reserve your space right now!



*An early fall
afternoon at Great
Swamp Watershed
Association's
Conservation
Management in
Harding Township,
NJ. 25 September
2011. Photo by S.
Reynolds.*

**Spooky Swamp Walk, costumes
encouraged!**

Friday, October 26 ,6:30 to 9 p.m.

*GSWA Conservation Management Area,
1 Tiger Lily Ln., Morristown, NJ*

Halloween is right around the corner! Is there a better time to visit a spooky swamp where owls hoot and coyotes cry? Come in costume or come as you are to this outdoor celebration of all things that go bump in the Great Swamp at night.

Little or big, all of the ghosts, ghouls, goblins, and witches who appear will be led on a special night-time tour of the darkest corners, eeriest boardwalks, and blackest recesses of GSWA's 53-acre Conservation Management in Harding Township. Expect lots fun...and lots of surprises! We've got a few tricks—and treats—up our sleeves.

Advance registration is appreciated, but not required. No charge for participation, but voluntary donations to the Great Swamp Watershed Association are welcome and may be made upon arrival. Costumes are encouraged! But, keep in mind that sturdy footwear and a jacket are recommended for this event.

(another event on next page)

Outdoor Programs *(continued from previous page)*

December's "Full Cold Moon" Hike at the Cross Estate Friday, December 28, 7–8:30 p.m.

Cross Estate, 61 Jockey Hollow Rd.,
Bernardsville, NJ

According to *The Old Farmer's Almanac*, December's full moon is called the Full Cold Moon. After all, this is "when the winter cold fastens its grip and the nights become long and dark." It's also a perfect time to sharpen your night senses! Join GSWA's Director of Education and Outreach Hazel England for this moonlight hike through the woods at the beautifully landscaped Cross Estate—part of the Morristown National Historical Park's New Jersey Brigade Unit in Jockey Hollow. We'll learn more about nature at night, and tune our ears to pick up the sounds of owls

hooting, flying squirrels chittering, and maybe even a coyote calling! After the hike, stop by GSWA's office at 568 Tempe Wick Rd. in Morristown to warm up with some hot cider, mulled wine, and a few snacks.

Families and children are encouraged to attend. Space is limited. Register online at www.GreatSwamp.org to reserve your space right now! There is no registration fee associated with this event; however, voluntary donations to the Great Swamp Watershed Association are gratefully accepted. Suggested donations: None for GSWA members and their families; \$10 per non-member adult (18+), \$5 per non-member child (6-17 years), or \$35 per non-member family (includes 4). There is no suggested donation amount for children 5 years and under. 

Shop At Back to Nature & Support GSWA

In July, Great Swamp Watershed Association (GSWA) became one of the first five organizations to receive a grant award from Conservation Resources through the new Back to Nature Fund. The award will be used to support ongoing restoration of the forest understory and landscaping for water conservation at our offices in Jockey Hollow in Harding Township.

The Back To Nature Fund is a cause-related marketing program developed by Conservation Resources which provides operating support for a select group of non-profit organizations that protect the environment. The Fund also provides grant funds for restoration projects. Support for the fund is provided by Back To Nature Home and Garden. Thank you to Conservation Resources and Back To Nature Home and Garden. Visit Conservation Resources, Inc. online at ConservationResources.org and Back To Nature Home and Garden at BackToNature.net.

Remember, all current GSWA members receive a 10% discount on goods and services from the Back To Nature Home and Garden retail store in Basking Ridge and from their website at BackToNature.net. Use the code **GSWA10** to receive your discount at checkout time and GSWA will receive a donation equal to 5.5% of your total bill. Back To Nature Home and Garden is located at 3055 Valley Road in Basking Ridge, NJ. Call them at 908-350-7506.



BACK TO NATURE FUND

Great Swamp Ark *(continued from page 1)*

before the deer had a chance to devastate the core of the Great Swamp National Wildlife Refuge. Today, almost everyone still just watches as nearly all the forests of the New Jersey Piedmont and southern Highlands are pilfered of their biodiversity by browsing deer. Policy makers still won't tackle the problem by creating a fundamentally new approach to reducing deer to ecologically tolerable levels.

Nevertheless, the USFWS isn't standing still. Not only do they continue to keep the deer density low, they make sure that other habitat elements remain in good order. They battle the pretty alien, purple loosestrife (*Lythrum salicaria*), by unleashing root-mining weevils and leaf-eating beetles. USFWS staff closely monitors and protects rare species—like bog turtles (*Glyptemys muhlenbergii*), blue-spotted salamanders (*Ambystoma laterale*), Indiana bats (*Myotis sodalis*), and red-shouldered hawks (*Buteo lineatus*)—that still call the Great Swamp home. Throughout the process, they have partnered with the Great Swamp Watershed Association and others to engage volunteers to help. Even though all this effort has required exceptional amounts of funding and person-power, it has been worth it!

Thanks to all this work, sensitive plant and animal species continue to thrive at the Refuge! Unlike degraded forests throughout the region, sightings of shrub-dependent animals, like the wood thrush (*Hylocichla mustelina*) and the azalea sphinx moth (*Darapsa choerilus*), remain common in the forest understory along the boardwalk. Rare aquatic plants sometimes make an appearance, just as American featherfoil (*Hottonia inflata*) did

for scientists working at the Refuge during GSWA's 2011 BioBlitz event. This year, the Refuge earned international attention when it was found to be the stronghold for a previously unrecognized leopard frog species! Can you imagine? A new species of vertebrate was discovered in northeastern New Jersey! What if our censuses of other animals, invertebrates for example, were more carefully conducted? What wonders we would find!

Let's use the Great Swamp as a shining example of natural resource stewardship and ecological restoration blended with public access, education, and partnerships. Maybe we can convince the rest of New Jerseyans that we need fundamental policy shifts and serious investment in the ecological restoration of our degraded landscapes; lest Great Swamp becomes the last ark that hasn't sunk. 🌱

GSWA Experts Available to Speak to Area Groups

Do you wonder, "What is in my water?" or "What can I do to ensure clean water for my children?" These and other questions about water quality, land preservation and local efforts to protect the environment can be answered by GSWA experts. They will present interesting, hands-on presentations that will educate and inspire members of your local club or group. Call today for more details: (973) 538-3500 x13.

Teacher Education Workshops, 2012–2013

Learning about the importance of water is a vital part of any student's academic career. Join the Great Swamp Watershed Association for all three of our hands-on, fun-packed teacher workshops to learn more about integrating water resource education, environmental stewardship, and critical thinking skills into your current curriculum. Workshops are held jointly with Great Swamp National Wildlife Refuge and the Friends of Great Swamp National Wildlife Refuge, and take place onsite at the Great Swamp National Wildlife Refuge inside the Helen C. Fenske Visitor Center located at 32 Pleasant Plains Road in Harding Township, NJ. Each event will include indoor and outdoor experiences. All participants will leave with an activity-packed teaching guide and other useful resources.

The fee for participation in each workshop is \$20/person. Up to six professional development credits (PDC) may be available for attendance at each workshop. Space is limited, so please register online right now at www.GreatSwamp.org. To register by telephone, please call GSWA's Director of Outreach and Education Hazel England at 973-538-3500 x20. For more information, please write to Hazel at hazele@greatswamp.org.

Project WET

Thursday, November 29, 2012, 9 a.m.—3 p.m.

Helen C. Fenske Visitor Center, 32 Pleasant Plains Road, Harding Township, NJ

Project WET is a collection of nearly 100 science-based, interdisciplinary activities with teacher-tested, classroom-ready lesson plans for K through 12 students. Activities use the vital importance of water to educate students about diverse topics. The updated guide is integrated into new online resources that make learning fun. Take the *Water Olympics* challenge to learn about the properties of water. Go on an *Incredible Journey* to learn more about the real water cycle. Track the transmission of disease as you follow along with *Poison Pump*, an exciting whodunit that is sure to get your students' attention. The Project WET teacher's guide is only available to educators who participate in a six-hour Project WET Workshop. Lessons in the guide are correlated to New Jersey Core Curriculum Content Standards. Workshop participants also receive supplementary educational materials focusing on New Jersey's water resources.



Area educators gain hands-on experience with lessons about water and water quality.

Testing the WATERS!

Saturday, February 9, 2013 , 9 a.m.—3 p.m.

Helen C. Fenske Visitor Center, 32 Pleasant Plains Road, Harding Township, NJ

How much of the earth's water is actually clean, safe, and available to drink? How can knowing what lives in a stream tell you about what has happened to it in the recent past? How can water testing help protect our water supplies? Find out just how much we learn by testing local streams and ponds in the Great Swamp Watershed region. We will use inexpensive, easy-to-obtain water quality test kits to maximize the scientific know-how you take away from this hands-on program.

This workshop takes place indoors and out. It features engaging lessons that introduce and deepen your students' understanding of water resource issues. All activities relate to core content standards, and provide engaging instruction designed to help your students gain real-world science experience and critical problem-solving skills. Participants end the workshop with a new understanding of the importance of chemical and biological water quality monitoring, and the uses of data generated by water testing. This workshop is well-suited for formal and informal educators teaching in grades 4 through 12, and beyond.

The Wonders of Wetlands (WOW!)

Saturday, March 16, 2013 , 9 a.m.—2 p.m.

Helen C. Fenske Visitor Center, 32 Pleasant Plains Road, Harding Township, NJ

Why is a wetland like a sponge? Can recreating a wetland in a kitchen pan tell you why protecting the soil is critical for water quality? Come to this workshop and learn all the answers to these water- and wildlife-based puzzles. The Wonders of Wetlands, also known as WOW!, is an engaging and activity-packed guide for formal and informal educators alike. It provides a resourceful and creative collection of wetland-related activities, information, and ideas that can be integrated into all areas of your curriculum. WOW! has been called, "the most comprehensive introduction to wetland issues and definitions." The WOW! guide includes more than 50 hands-on, multidisciplinary activities in lesson-plan format, extensive background information about wetlands, ideas for student-action projects, and a wetlands resource guide. This workshop is well-suited for educators teaching in grades K through 8, as well as those who might have access to, or are considering creating their own wetland education site or field trip. 🌿

Start Your Day with GSWA

Great Swamp Watershed Association's (GSWA) Breakfast Briefing speakers' series returns in October!

Our seasonal Breakfast Briefing series was developed to help busy professionals stay informed about community environmental issues without taking valuable time away from work or family



life. Presentations are kept brief, focus on current environmental topics, and minimize overlap with most traditional business hours. These lecture-and-discussion events are usually held on the second Tuesday of the month from 8 to 9:30 a.m. Exceptions to this schedule are noted in the event descriptions below, so please read them carefully.

Seating is limited. Please register online to attend at www.GreatSwamp.org, or call our Event Information Hotline at 973-538-3500 x22 to register by telephone. GSWA members participate free of charge. Non-members are asked to make a voluntary donation of \$10/adult and \$5/child (6 to 17 years old), or \$35/family (includes 4). There is no suggested donation for children 5 years and under. Programs are suitable for all ages. For updates or cancellations, please call our Event Information Hotline at 973-538-3500 x22.

The Raritan & the Passaic: A Tale of Two Rivers

Tuesday, October 16, 8–9:30 a.m.

GSWA Office, 568 Tempe Wick Rd., Morristown, NJ

Dr. Judy Shaw, Senior Research Associate and Director of the Sustainable Raritan River Initiative at Rutgers University's Edward J. Bloustein School of Planning and Public Policy, will join us for our first Breakfast Briefing of the fall season.

What can we learn from our neighbors about protecting our waters and our land? What can we offer them in return? The Raritan River Watershed and the Passaic River Watershed, home of the Great Swamp, share a border, but we want to know if they share more. Dr. Judy Shaw, director of the Sustainable Raritan Initiative at Rutgers University, will stop by to help us with a comparison of these two important regional river systems. Which water pollution issues do they share? Which are not the same? How do communities and governments address flood problems in each river basin?

In addition to Dr. Shaw's presentation, author Mary Bruno will be on hand to provide additional perspective on Passaic River issues. Mary's book, *An American River: From Paradise to Superfund, Afloat on New Jersey's Passaic*, chronicles her experiences kayaking the Passaic in pursuit of a reason for why its waters remain so troubled. Autographed copies of the book will be available for sale during the event.

State of the Streams in the Great Swamp Watershed

Tuesday, November 13, 8–9:30 a.m.

GSWA Office, 568 Tempe Wick Rd., Morristown, NJ

GSWA's Director of Water Quality Programs Laura Kelm joins us today to discuss water quality findings from the organization's recent State of the Streams project.

Water quality data has been collected from all five streams in the Great Swamp Watershed for more than 10 years. Over the past year, GSWA staff and volunteers have analyzed this chemical, visual, and biological data to see how our streams have changed over time, identify areas that have improved, note sites for potential restoration projects, and uncover pollutants that may have gone unnoticed. In addition to reviewing the findings from this study, today's briefing will include a discussion of how the organization's water testing programs may proceed in the future.

The Economic Implications of Climate Change in New Jersey

Wednesday, December 5, 8–9:30 a.m.

GSWA Office, 568 Tempe Wick Rd., Morristown, NJ

Please join GSWA as we welcome Professor Joseph J. Seneca from Rutgers University's Edward J. Bloustein School of Planning and Public Policy for this final Breakfast Briefing event of the fall season.

Many complex economic issues arise with respect to how to efficiently mitigate climate change. Today's seminar will explore the economic rationale for public policy intervention to reduce emissions of greenhouse gases. We will discuss how the global nature of climate change poses particularly difficult problems for effective mitigation. The economic rationale for public interventions will be examined along with the types of policies that can be used: e.g., regulation, subsidies, taxes, cap and trade, green standards. The interface of climate change policy, conventional energy sources, and alternative energy technologies add to the complexity of the problem. The economic implications of climate change for New Jersey and the region will be examined. 🌲



Erosion damage along Loantaka Brook, one of the five major streams of the Great Swamp Watershed. January 2012.

Annual GSWA Gala, October 4

The Great Swamp Watershed Association (GSWA) will celebrate its 31st anniversary of service to the local environment and local communities on Thursday, October 4, at the Westin Governor Morris in Morristown. This year's event honors **Dr. Emile DeVito**, who currently serves as manager of science and stewardship at the New Jersey Conservation Foundation and frequently volunteers his services as field guide, birder, and expert scientist for GSWA programs throughout the year. Don't forget to read the cover story he authored for this issue of *Across the Watershed*!

New Jersey is a better place because of Emile DeVito. In addition to being a New Jersey native son, Emile is one of the state's foremost environmentalists. His relentless and dedicated advocacy stretches from the Pine Barrens to the Highlands. He has championed the protection of many indigenous species of wildlife, from the eastern timber rattlesnake to the barred owl. He is also an inexhaustible source of environmental knowledge and know-how for nonprofit organizations and governmental bodies throughout New Jersey.

In recognition of Emile's many achievements, David and Mary Moore have agreed to serve as honorary co-chairs for this gala

event. At some point during his 30-year tenure as Executive Director of the New Jersey Conservation Foundation, David discovered Emile's talent for conservation work and shrewdly offered him a job right out of graduate school. As honorary event chairs, David and Mary have been working diligently along with event chairs Michael and Marilyn Dee, auction chairs David and Susan Budd, and our 40-person gala committee to generate enthusiastic support for all our festivities.

Of course, no GSWA gala is complete without our famous silent auction! Our chairs, committee members, and staff have been busy all summer collecting a wide variety of fantastic items for you

to bid on in October. As of mid-August, more than 60 auction items with a combined estimated value of more than \$34,000 had been donated. Here's a quick peak at a few of the best lots—

- A bottle of 1982 Château Léoville Las Cases, Bordeaux; a wine described by one reviewer as "...the most hedonistic and concentrated Léoville-Las Cases I have ever tasted."
- A duo of golfing foursomes at Trump National Golf Club in Bedminster and Trump Pine Hill across the river from



*This year's gala honoree,
Emile DeVito, Ph.D.*

Philadelphia—two of the best courses in the state.

- A private tour of the Franklin Parker Preserve in the New Jersey Pine Barrens, led by Dr. Emile DeVito himself!
- A two-day fly fishing trip at Brodhead Creek in the Poconos.

Gala Underwriting and Advertising Opportunities Available!

PSEG and Trump National Golf Club have become **Gold Underwriters** for this year's gala! Will you be joining them?

GSWA is looking for a few good businesses and individuals to support our 2012 gala celebration! Become a **Gala Underwriter** and your company will receive top billing at the event and in all of our gala-related publications. Or place an ad in our *Commemorative Gala Program*. Whether you are congratulating our honoree or promoting your business, your ad will reach an audience of hundreds of individuals who are committed to our local environment and our local communities.

For more information about underwriting or advertising opportunities, please call GSWA at 973-538-3500 or send an email message to drice@greatswamp.org.

- Signed NHL memorabilia from the NJ Devils and the Chicago Blackhawks.
- A private, docent-led tour of the Museum of Natural History in New York City.
- A picnic for six at the Somerset Lake and Game Club.
- A week-long luxury townhouse rental in Big Sky, Montana.
- Several aerial tours of the Great Swamp, New Jersey, and the Hudson River Valley.
- A three-day, two-night stay at the Rio Mar Beach Resort in sunny Puerto Rico.

More auction items are rolling in every day, so remember to come prepared to bid often and bid big!

If you would like to join us for this special occasion, but have not yet received your invitation, please give us a call at 973-538-3500. Purchase gala tickets or find more information about the event online at www.GreatSwamp.org. 

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Water-friendly Living: Creating a Water-friendly Yard

by Hazel England, GSWA Director of Education & Outreach

What does a water-friendly yard look like?

You might be surprised! A water-friendly yard looks a lot like your current yard. In some cases, it might even look better!

We want to give you the scoop on a few subtle landscaping improvements that will help you take advantage of all that precious water flowing into, over, and around your home and property. These are changes that will improve your soil's ability to store water, help it support more choice plantings, and, best of all, keep that water clean and clear of pollutants.

Once your water-friendly yard is finished, the benefits begin rolling in. Birds, bees, and butterflies will want to be your new neighbors. Your human neighbors will marvel at your new landscaping skills. Your water bill might just go down! So, read on to learn how water moves through and beyond your yard, and how following our simple tips will help you harness this important resource for the betterment of all.

The case for water-friendly yards

After all the freak snowstorms, hurricane-related flooding, and blazing heatwaves of the past year, you can be forgiven for wanting to give up on your yard entirely. But take heart! All these extreme weather events have likely weeded out plants that are unable to survive the new normal for our climate here in New Jersey. It's also likely that our weather has taught you where water ends up after a rainstorm, and how well your yard deals with stormwater. It's time to put this hard-earned knowledge to use and help you plan

how to deal with future extreme weather events more efficiently.

During storms a lot of water can fall in a short amount of time. The downspouts carrying water away from your house do their job and do it quickly, but where does the water go then? Typically it flows down your driveway or sheets across your lawn, and vanishes into a storm drain. Very little of it actually soaks into your soil to benefit the roots of your trees and plants.

Although you've probably never seen it, the water entering all those storm drains eventually exits into a stream. In the Great Swamp Watershed each stream receiving stormwater flow from our homes and businesses reacts differently depending on how much human beings have built up the surrounding land. If the area has lots of impervious cover—roads, parking lots, homes, etc.—water runs off quickly and with great force. These are places where erosion and pollution wreak tremendous havoc. In areas that are not so developed, like those around the Great Swamp National Wildlife Refuge, stormwater flow is gentler and much more in keeping with natural processes observed in places that remain undisturbed.

In fact, the rain that falls on pristine forested watersheds soaks directly into the ground where it is released at a slow and steady rate into nearby streams. Since the forest acts like a slow-release valve or a giant sponge, there is virtually no runoff, and virtually no flooding. Water-friendly yards mimic this slow-release process, only on a

smaller scale. They manage the stormwater moving through and over your property in a way that pushes it deep into your soil layers. You may not be able to change the amount of rain that falls, or the amount of impervious cover around you, but you can help that water get to where it needs to go—into the ground—by making a few small landscaping changes.

The goal: Duplicate a few of Mother Nature's solutions to the problem of stormwater runoff, while maintaining a yard that's both aesthetically pleasing and neighborhood friendly.

Four simple tips for supporting your yard and nearby streams

Add organic material

Soil that is rich in organic material functions better than soil composed mostly of bare minerals. Grab a handful of soil and give it a closer look. Is it a rich brown color? Does it have a strong, earthy smell? Can you see small pieces of plant breaking down within it? If your soil looks more like chunky concrete, or dried out pottery shards, then you need an organic-material boost!

Organic material captures many waterborne pollutants. It removes nitrogen and other excess nutrients that are best kept out of streams. It also holds water in the root-rich, upper layers of soil where it most benefits thirsty plants. Try adding leaf mulch, well-rotted and well-aged manure, composted grass clippings, or your own food and yard compost to your soil for maximum

water retention. Peat works too, but only as a last resort: go peat-free first!

Running a lawnmower over grass clippings and the fallen leaves of late autumn will create a very fine top dressing for soil that you can spread thickly around shrubs and tree bases. Over winter, this top layer will sink deeper into your yard and begin mimicking the spongy, rich soils of those undisturbed forests. Here's a side benefit; as organic material breaks down it releases an enriched nutrient tea for your plants to drink and provides an ideal natural, slow-release fertilizer for shrubs. Wouldn't it be great to stop shopping for store-bought fertilizers!

Create vegetated buffer strips around your perimeter

A typical homeowner's property might include 20% to 40% impervious cover. These are places where water cannot sink into the ground at all. Doesn't it make sense to reclaim some of the runoff caused by those hard surfaces? After all, it's clean water just waiting to be harvested!

You can take advantage of this free resource by understanding that vegetation naturally slows stormwater flow. All those stems, trunks, and leaves get in the way as gravity pulls the rain to Earth. Take a look at the soil bed around one of your shrubs during a low- or medium-intensity rain storm. Notice all the spongy, damp leaf litter that has accumulated here? All the leaves and branches of your shrub intercepted the fast-moving rainwater on its way to the ground.

(continued on next page)

Water-Friendly Living *(continued from previous page)*

As the slower-moving droplets reached the soil, they became less likely to continue downhill and more likely to sink in. This means that giving more of your property over to substantial strips of vegetation like low shrubs and trees will help you lose much less water to runoff.

Want another way to add water-retaining vegetation to your property? Consider leaving a strip of grass on the down-slope of your lawn untouched by your lawn mower. The strip should be two or three feet wide and grass height should be kept between eight to twelve inches. Manage the height with clippers or a weed-whacker, and you will be amazed at how moist your yard stays and how much lower your water bill is. If your new buffer strip happens to run along your driveway, or another paved surface, you'll also find out how much grease, oil and other debris that tall grass can filter.

Here's one more tip. Sow your buffer strip with wildflowers to add more color and beauty to your yard. The bees and the butterflies will thank you!

Create a rain garden or infiltration bed

Have you ever looked with regret upon all that rain water gushing from the downspouts on your house or down your driveway? Do not despair! All that useful and beneficial moisture can be diverted to a beautiful landscaping feature called an infiltration bed or rain garden. In its simplest form, a rain garden is little more than a shallow depression in your yard situated downhill from the outflow of your gutter pipe. Instead of cascading onto the street and into a storm drain in a matter of seconds, stormwater from your home collects in the depression



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where it can slowly sink into the ground over a period of minutes, hours, and even days.

Of course, after discussing all of the water-retaining benefits of ample vegetation, it should come as no surprise to learn that most rain gardens contain a variety of native perennials and shrubs. Native plants are better suited to rain garden use than ordinary ornamentals because they are capable of thriving under a wide range of weather conditions, from drought to inundation and everything in between. You'll also have the satisfaction of knowing that you have not contributed to the spread of any non-native invasive plant species.

Once you have identified the ideal low spot on your lawn for a rain garden, you'll need to start digging. Remove topsoil inside the depression until you have created a low lip of ground along its downhill edge. If your soil is heavy and laden with clay, amend it with a mixture of sand and rich organic material to improve water infiltration. This will also help you filter out the debris and pollutants that stormwater washes off rooflines and down driveways.

Now that you've attended to the soil, it's time to start planting. Some of the very best low-maintenance native shrubs for rain gardening include highbush blueberry (*Vaccinium corymbosum*), sweet pepperbush (*Clethra alnifolia*), and witch hazel (genus *Hamamelis*). Joe-Pye weed (genus *Eupatorium*), cardinal flower (*Lobelia cardinalis*), purple coneflower (genus *Echinacea*), and blue flag iris (*Iris versicolor*) are just a few of the native perennials that stand out from the rain garden crowd. (A complete list of beneficial native plants can be found on our website at www.GreatSwamp.org.) When all is said and done, almost any native will get the job done. Each thirsty plant will guzzle up lots of water to replace what it loses through transpiration, and each root system plunging deep into the soil will provide rainwater with an express lane into the ground.

As part of an overall landscaping plan, a rain garden can and should be aesthetically pleasing. You also should expect more visits from local wildlife. Once they find all those natives plants, your yard will begin to teem with life!

Maintain Tree Cover

If you crave sun-loving plants but live on a shady lot, the temptation to remove trees and open the canopy over your yard can be great. Before you break out the chainsaw though, take a moment to consider all the benefits you are giving up. The shade from those trees is helping you keep energy cost lower by ameliorating temperature extremes. They are blocking some of the racket from that nearby road and your noisy neighbors. And, like those shrubs and perennials you planted, they are slowing the descent of rain

water and helping to trap it in the ground. Think about all the erosion those trees are preventing, and how much more hospitable your soil is for other plants now that the temperature is lower and there is more moisture. Maybe cutting down that tree cover isn't such a good idea after all!

Consider limbing your trees as an alternative to clear-cutting. Remove a few branches to let more light onto your yard. This way, you will retain all the benefits of a good tree cover. Pruning also helps your trees withstand all the late fall and early spring windstorms and snowstorms that keep popping up here in northern New Jersey.

It's never too early to start!

If you're thinking that fall has arrived, and it's just too late to start building a water-friendly yard, think again! Fall is a great time to begin incorporating all five of these tips as you prepare to winterize your property and plan for next spring's landscaping challenges. Here at GSWA, we hope part of that new challenge will include some thoughts about water and how keeping more of it on your lawn and in the ground will benefit your plants, the curb appeal of your home, your pocketbook, and your neighborhood. Start your water-friendly yard project today. We'll thank you for it, and so will your local stream! 

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and join the cause on

facebook

Water-friendly Homes— A New Series of Educational Workshops

Water-friendly households help keep the Great Swamp great! Our pilot Water-friendly Homes program recognizes homeowners who are actively working to improve the quality of water around them. Get a jumpstart on this fun new community environmental program—which we will tell you more about later this year—by attending these special workshops designed to help you improve water quality in and around your home, and reduce the amount of water leaving your property as stormwater runoff. Will your family help us protect the Great Swamp Watershed and the Passaic River?

Please visit www.GreatSwamp.org to register for all events, or call our Event Information Hotline at 973-538-3500 x22 to register by telephone. GSWA members participate free of charge. Non-members are asked to make a voluntary donation of \$10/adult and \$5/child (6 to 17 years old), or \$35/family (includes 4). There is no suggested donation for children 5 years and under. Programs are suitable for all ages. For updates or cancellations, please call our Event Information Hotline at 973-538-3500 x22.

UltraSmart Gardening Wednesday, September 19, 7–8:30 p.m.

*GSWA Office, 568 Tempe Wick Rd.,
Morristown, NJ*

Learn how to make your garden more eco-friendly! Join us for this hands-on workshop and pick up some simple tips you can use in the garden to improve your landscaping and for the benefit of local wildlife, water quality, and environmental conservation. We will help you choose native plants that are excellent managers of water, and work hard to keep pollution out of nearby streams. We'll show you ways to make your soil more effective at absorbing rainfall and nourishing your trees, shrubs, and plant beds. And, we'll talk about rain gardens and vegetation buffers that attract wildlife and limit the amount of rainfall running away from your property.



GSWA is now blogging at
<http://acrossthewatershed.blogspot.com>

**Reduce Your Use! Outside Edition
Wednesday, October 24, 7–8:30 p.m.**

*GSWA Office, 568 Tempe Wick Rd.,
Morristown, NJ*

Are you a water hog, or a water miser outside your home? Join us for this workshop to learn concrete steps you can take to reduce water use—and your water bill—outside of your home. Whether you live in town or in the country, we don't blame you for giving up on your yard and property after all the floods, droughts and other crazy weather we've had. Take this opportunity to regain control and learn how a few simple landscaping techniques can reduce your need for excessive watering and help you ward off flood waters. We'll examine different types of irrigation that conserve water when you need it and contain it when you've got too much. We'll also show you how to get free water from the skies, even when it's not raining! This is your chance to waterproof your yard and stop paying that expensive water bill every year.

**Reduce Your Use! Inside Edition
Wednesday, November 28, 7–8:30 p.m.**

*GSWA Office, 568 Tempe Wick Rd.,
Morristown, NJ*

Are you a water hog or a water miser inside your house? Do simple household tasks like showering or washing dishes require lots of water or just a gallon or two? Join us for this workshop and learn how you can use less water and lower your water bill inside your home. We'll teach you some simple tips to reduce the number of gallons you and your family use each day. We'll also help you understand where all that water goes when you're done with it, and how important it is to watch what you put into your household sewer system. Remember, it takes only two or three days for the sewer water leaving your home to be treated, discharged, and then scooped up again for drinking water further along the Passaic River. This is your chance to take action that benefits our water and your pocketbook. Sign up right now! 🌱



The leaf litter in your yard can help enrich your soil and keep rainwater on your property. Sweetgum Fall Leaves by B. Rothauser.

Local Solution to a Big Problem: Madison Pharmacy Program Offers Safe Disposal of Waste Pharmaceuticals

by GSWA Communications Task Force

What do you do with the unused, unwanted, or expired drugs and medications in your home? If you're like most people you do one of these two things: you flush them down the toilet, or you let them sit in an out-of-the-way corner gathering dust for weeks, months, or years.

Neither one of these options is particularly appealing, especially when you stop to consider the consequences. Letting your drugs sit around leaves them accessible to those who might abuse them. According to the Office of National Drug Control Policy, prescription drug abuse is growing fast, and about one out of every three people over age twelve who used drugs for the first time in 2009 started with prescription medication.

Flushing your pharmaceuticals is no better. While toilet disposal offers an immediate, out-of-sight-out-of-mind solution, it only spreads the problem. According to an investigative report conducted by The Associated Press, Americans flush about 250 million pounds of drugs and contaminated packaging every year.¹ If you think all those substances sit harmlessly in the septic system or are filtered out of wastewater at the local sewer treatment plant, guess again! They're more likely to pass through those manmade systems and into the environment where they contaminate our rivers, lakes, streams, groundwater reserves, and even our treated drinking water supplies.²

The effects of drug-tainted water on aquatic wildlife are especially profound. The U.S. Geological Survey notes several studies where byproducts of pharmaceutical contamination have been linked to the formation of lesions and reproductive problems in mature fish populations, as well as problems with severe endocrine disruption among juvenile fish.³ Perhaps the

most recognizable reporting on this issue hails from the region around our own national capitol along the Potomac River where the discovery of large colonies of intersex fish—animals that simultaneously display

underdeveloped male and female sex characteristics—has prompted widespread public outcry.⁴

What can be done?

The Great Swamp Watershed Association recognizes the combined threat that improper disposal of pharmaceuticals represents to the local waterways we protect and the local communities we serve. Over the past several months we have tried to keep you informed of drug take-back initiatives like the American Medicine Chest Challenge and the U.S. Drug Enforcement Agency's Take Back program. Both programs are run by local law enforcement agencies and were designed to provide ordinary people like us with an opportunity to safely remove unused, unwanted, or expired pharmaceutical products from our homes.



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Although these semi-annual programs have been quite successful, they only happen twice a year at locations that are often quite far away. We have fielded several inquiries from watershed residents who wish to discard their medications, but have missed the police-organized events or cannot travel so far away. That is why we are excited to tell you about Madison Pharmacy's participation in Dispose My Meds—a nationwide program run by the National Community Pharmacists Association (NPCA) that encourages local pharmacies to dispose of drugs properly, in addition to dispensing them.

The Dispose My Meds program, which was initiated in 2010, enables Madison Pharmacy, located at 66 Main Street in the borough, to safely collect and dispose of almost all household medications using the Sharps Takeaway Environmental Return System. You do not need to be a current pharmacy customer to participate, and best of all, there is no charge for using the service. Some of the larger chain pharmacies charge customers a substantial fee for similar disposal opportunities.

According to a press release issued by NPCA in April 2012, the Dispose My Meds program has already collected more than 70,000 pounds of pharmaceuticals across the country.⁵ That's an impressive number, but we wanted to understand how it would translate into a local setting. So, we called Frank Iannarone, owner of Madison Pharmacy, and asked him to tell us more about why he chose to participate in Dispose

My Meds, and how people have been responding to it. Here's a short transcript of that conversation:

GSWA: What prompted you to begin taking part in Dispose My Meds?

Mr. Iannarone: "Honestly, the original concern was about kids abusing prescription drugs. We wanted to make sure we did all we could to keep that from happening. I guess one of the side benefits was that we also kept the drugs out of the water supplies and out of the environment."

GSWA: Have many people taken advantage of the program?

Mr. Iannarone: "Tons. Unfortunately, we are not allowed to take controlled substances [under this program].⁶ The police collect those substances a few times a year [during their programs]. But we fill up several huge containers [with other types of drugs] ... We get people from all over coming in."

GSWA: How big are the containers and how often do you fill them?

Mr. Iannarone: "We started off with something the size of a small cooler and now we're up to something like a small refrigerator... Right now, we're ordering 20 gallon containers."

GSWA: And, how often do you fill one of those up?

Mr. Iannarone: "We go through about four a year."

GSWA: Do you know what happens to the drugs you collect after they enter the Sharps system?

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GSWA Announces Changes to its Board of Trustees, Staff

Great Swamp Watershed Association (GSWA) extends a warm welcome to the newest members of its Board of Trustees, John Neale and Tony Rogers.

Madison resident **John Neale** is the current president of Northern New Jersey Catchers (www.nnjc.org) and a frequent land stewardship volunteer at GSWA's 53-acre Conservation Management Area in Harding Township. **Tony Rogers** hails from Westfield where he lives with his wife and children. Tony is a Senior Director with BNY Mellon Wealth Management located nearby at Giralda Farms in Madison.

We also thank former Board Member Paul Steck for his untiring dedication to our

organization and all of its programs. Paul retired from the Board of Trustees earlier this year.

In August, Director of Institutional Relations **Carlos Pomares** became the newest member of GSWA's staff. Carlos will be assisting Development Director Steve Howard with grant applications and other fundraising activities. Please welcome him the next time you drop by our office!

If you have an interest in environmental stewardship, education, and advocacy, and seek an opportunity to provide your support and services as a member of GSWA's Board of Trustees, please contact Executive Director Sally Rubin at 973-538-3500. 🌲



Thanks, Green Path!

Green Path Organic Landcare is a family-owned landscaping and ecological management company operating in the Chatham area. All of us at GSWA would like to thank the Green Path team for dutifully managing the yard and land around our office space on Tempe Wick Road in Morristown. Green Path generously donates this service to our organization.

2011 Macroinvertebrate Survey Results

by Laura Kelm, GSWA Director of Water Quality Programs

Aquatic macroinvertebrates are the small, spineless creatures that live in streams, such as insect larvae, worms, and crayfish. Macroinvertebrates, or MIVs, live only for a period of a few weeks to a few years, and different species have different levels of tolerance for water pollution. By looking at the types and numbers of MIVs found in a stream, we can tell a lot about its water quality over a period of time.

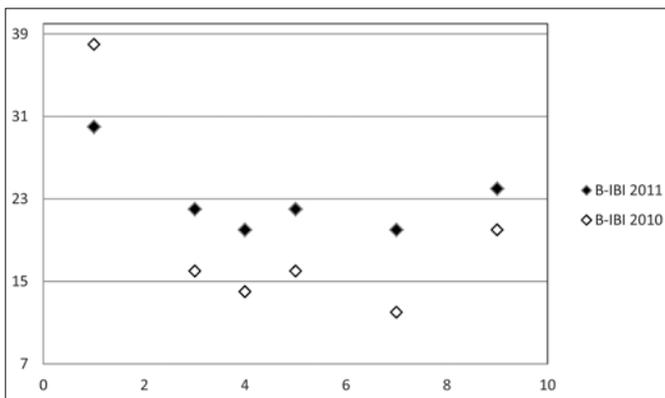
Dr. Lee Pollock, retired Drew University Professor of Biology, has been surveying the macroinvertebrates of the Great Swamp Watershed since 2000. Every spring, Dr. Pollock samples MIVs at 17 sites throughout the watershed. First, he identifies all the species he finds. Then he calculates a score for each location based on the Benthic Index of Biological Integrity, or B-IBI. Each survey site is categorized as very poor, poor, fair, or good depending on the B-IBI score it receives.

While all of the survey sites show some variation in their scores from year to year,

a majority have shown some slight improvement over the past 12 years. Dr. Pollock has noticed a similar trend at sampling sites within the Rockaway River Watershed, where he also monitors MIVs each year. He attributes the upward trend in B-IBIs to an increase in annual precipitation in the region, which tends to dilute pollutants in streams and improve conditions for MIVs.

The results from the 2011 survey around the Great Swamp Watershed include five sites ranked as *good*, two ranked as *fair*, and ten ranked as *poor*. No sites were ranked as *very poor*. This is an improvement over 2010 when a total of four sites received the *very poor* ranking. Since 2010, one site—PB2 on Primrose Brook—showed a significant decrease in MIV community quality, while four others—GB2, GB3, and GB4 along Great Brook, LB3 on Loantaka Brook, and PR1 on the Passaic River—showed marked improvements (see graph below).

Primrose Brook and the Passaic River are considered higher quality streams in our



Data used in this chart is from Pollock, L. W. 2012. *The Macroinvertebrate Communities of the Great Swamp Watershed, 2011: Results.*



Dr. Pollock rubs the rocks just upstream of his sampling net to detach any MIVs. The streamflow will carry them into his net.

watershed. Both achieve site scores that rank well above those of Black Brook, Loantaka Brook, and Great Brook. While a significant drop in ranking at any site warrants attention, it is especially troubling when that site is on Primrose Brook. After reviewing data recorded at the PB2 site on Primrose Brook and finding no significant changes over the last three years, Dr. Pollock looked more closely at the B-IBI scoring system and its components. He discovered several factors included in the calculation that had declined only by small amounts, including the number of taxa found at the site, and the proportion of predators present in the MIV community. Taken together, the small declines measured in each of these factors crossed a scoring threshold, which, in turn, translated into a large B-IBI point drop. This is not necessarily indicative of any problem at the site.

Great Brook is considered one of the more stressed streams in the watershed, so when improvements were found at three of its survey sites, we took notice. A review of data collected at those sites over the last few years revealed a distinct pattern of variability over time. After examining factors contributing to the B-IBI score for those three sites, Dr. Pollock found a major factor at play. There was a predator-prey relationship between two MIV species, blackfly larvae and the predatory chironomid larvae.

As is common in predator-prey relationships, populations of predator and prey show an inverse relationship. In other words, when the prey population is large, the predator population increases. This relationship causes prey numbers to decrease, which, in turn, leads to a decline in the predator

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School Water Monitoring on the Passaic— Program Expanding

by Laura Kelm, GSWA Director of Water Quality Programs

A lot has been happening with our School Water Monitoring on the Passaic (SWaMP) program. Started in 2010, SWaMP involves local high school and college students in monitoring water quality along the Passaic River and its tributaries. In the past, students have monitored pH, temperature, turbidity (water clarity), dissolved oxygen, bacteria, and nutrients. Beginning this fall students will also conduct visual stream assessments and biological assessments at their sites. These additional components, funded by a generous grant from the Captain Planet Foundation, will give students a broader view of water quality and the role that streams play in the ecosystem.

Schools participating in the program are located within and around the Great Swamp Watershed and farther downstream. Classes from Bernards High School, Kent Place School, Drew University, College of Saint Elizabeth, Watchung Hills Regional High School, Garfield High School, and West Morris Mendham High School all participated in the program last year. Passaic County Community College students will begin participating in the fall.

Most classes sample at one location near their school, but since November 2011, faculty and students from the College of Saint Elizabeth have been sampling at sites all along the Passaic River, from Mendham to Newark. The data gathered during this



Bernards High School students complete water quality data sheets for samples taken from Penns Brook in Bernardsville, NJ. Photo by W. Boyce.

project will show how the Passaic changes as it runs its course from the relatively suburban landscape around the Great Swamp through progressively more urbanized areas to its outlet in Newark Bay.

Want to see what the students are finding? Visit www.imrivers.org/gswa_swamp to see an interactive map of the sampling sites and the data collected. If you know a high school or college class that would like to get involved in SWaMP, contact Laura Kelm at lkelm@greatswamp.org or 973-538-3500, ext. 16. 🌲



GSWA's Director of Water Quality Programs Laura Kelm (front) assists a student from the College of Saint Elizabeth with a pH measurement at Riverside County Park in Lyndhurst, NJ.

Join the World Water Monitoring Challenge

When was the last time you tested the water in your local stream? GSWA monitors streams throughout the Great Swamp Watershed, but this is your opportunity to measure the water quality at your local pond, lake, brook, or fishing hole. From September 18 through October 18, GSWA will participate in the World Water Monitoring Challenge (formerly known as World Water Monitoring Day), an international education and outreach program that builds awareness and involvement in protecting water resources by engaging citizens to conduct basic water quality monitoring. It's easy to get involved—borrow a test kit from



GSWA, head to a local stream or water body, collect your data, and report your results online. The user-friendly kits allow you to easily measure temperature, pH, turbidity (water clarity), and dissolved oxygen. The data you submit will be incorporated into a list of results from the entire challenge, which you will be able to download and review at WorldWaterMonitoringDay.org. This is a great hands-on activity for adults and kids, so get the whole family involved! For more information or to check out a test kit, contact Laura Kelm, GSWA's director of water quality programs, at lkelm@greatswamp.org or 973-538-3500, ext. 16.

What We Did On Our Summer Vacation!

Some people make a beeline for the amusement park. Other people go exploring in the mountains. Here in New Jersey, lots of people lounge “down the shore.” So, what do GSWA board members, staff, and volunteers do during their summer vacations? They visit a wastewater pollution control plant, that’s what!

On Wednesday, July 25, 2012, Board Member Eric Inglis, volunteer Joe Balwierzak, Executive Director Sally Rubin, and staff members Hazel England, Laura Kelm, Sue Levine, Debbie Rice, and Steve Reynolds dropped by the Woodland Plant run by Morris Township’s Wastewater Pollution Control Utility (WPCU) to learn a little bit more about where water goes and what happens to it after it leaves a home or a business as waste.

Our tour, which was skillfully led by Plant Superintendent Mark Howarth and Plant Foreman Joe Morrison, has become something of an annual pilgrimage. A number of GSWA groups have visited the Woodland Plant since it was overhauled in 1992. In fact, GSWA’s own Science and Technology Committee (now known as the Land and Water Stewardship Committee) wrote and published a very thorough explanation of the facility’s layout, mechanics, and biochemical processes in the Fall 2006 issue of *Around the Watershed*. (Find back issues of *Around the Watershed* online by visiting our website at www.GreatSwamp.org.)

Instead of duplicating what was written in 2006, we thought it might be more fun to

tell you what’s changed and what’s changing at the Woodland Plant, as well as some facts about wastewater treatment that have stayed with us since this last visit. Here’s the list—

- The Woodland WPCU Plant relies on microorganisms and bacteria to clean the water flowing into it from the Morris Township sewer system. Plant supervisors must carefully balance the plant’s food-to-microorganism ratio if wastewater is to be cleaned properly. In this case, the food that feeds those microorganisms is waste.
- The Woodland Plant treats about one million gallons of wastewater each day (mgd). Its sister facility, known as the Butterworth Plant, treats about 3.3 mgd, and is located near Speedwell Lake. By comparison, the Passaic Valley Sewerage Commission plant in Newark treats about 330 mgd.
- The treatment system at the Woodland Plant is redundant; the plant can handle up to 2.3 mgd. However, because there are limits to the amount of treated water that can be discharged into nearby Loantaka Brook, the plant is only permitted to treat a maximum of 2 mgd.
- The average household served by the sewer system leading to the Woodland Plant uses about 100 gallons of water each day. About 100,000 people live and work in the plant’s service area.
- It takes about 24 hours for wastewater to pass through the treatment processes at the Woodland Plant before it is discharged into Loantaka Brook. In another 24 to 48

hours that treated wastewater has moved through the Great Swamp, entered the Passaic River, and travelled all the way to Little Falls, NJ.

- A water pumping station located near Little Falls and maintained by the Passaic Valley Water Commission draws enough drinking water from the Passaic and other nearby sources to supply 4 million people at homes and businesses throughout Bergen, Essex, Hudson, Passaic, and Union counties.
- The wastewater flowing into the Woodland Plant often doubles after strong rainstorms.
- The Woodland Plant may exceed its capacity when a rainstorm or its equivalent

delivers more than 6.6 inches of rain water inside the service area.

- When the supply of electricity to Woodland is cut off, as it was during Hurricane Irene in 2011, the plant runs off power generated by a V8 diesel engine that delivers 2 million watts.
- If solid matter and chemicals are discarded into the sewer system and they do not biodegrade within 24 hours, they can cause serious problems at the Woodland Plant. Solids, like feminine hygiene products, can clog the system and chemicals, like pesticides and pharmaceuticals, can kill the microorganisms and bacteria that clean the water. Repairs often cost millions of dollars.
- The Woodland Plant is undergoing a \$6 million upgrade that will improve its ability to treat wastewater for nitrate contamination. According to a new state standard that did not exist when the facility was built, nitrates in the water discharged by the plant will need to be at or below 10.7 milligrams per liter (mg/l). Municipal bonds are paying for these upgrades.
- Water testing at the Woodland plant occurs on a cyclical basis. For internal purposes, plant staff test the water moving through

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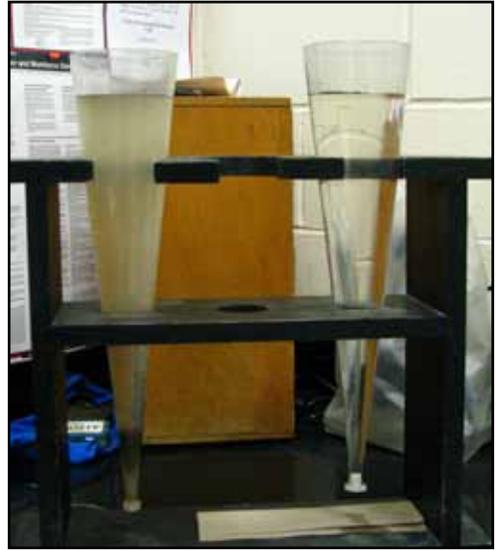


This is what happens when you flush items, such as feminine hygiene products, that cannot biodegrade within 24 hours. Despite being broken up by mechanical macerators, the materials clump together to form "islands." Those islands of debris frequently clog the plant's machinery, and must be removed from the treatment system by hand. Photo by L. Kelm.

Summer Vacation *(continued from previous page)*

the system each day. For official reporting purposes, tests may be conducted on weekly, monthly, or quarterly basis according to state requirements. Among other factors, the plant's water is tested for phosphorous level, carbonaceous biological oxygen demand (CBOD), ammonia level, and pH (acid/alkali).

- Certain species of aquatic wildlife are used during CBOD testing. The so-called "acute test" involves the use of fat-head minnows. The "chronic test" uses water fleas. These animals must not only be able to survive when exposed to the plant's effluent (the water it discharges), they must also be able to reproduce effectively.
- Ultraviolet light (UV) is used to sterilize any microorganisms and bacteria lingering in the treated wastewater before being released into Loantaka Brook. When it was installed, the UV system at the Woodland Plant was cutting-edge technology. Given its age and the growth of new UV technology, the system is undergoing a \$500,000 upgrade. The upgrade will replace the original UV lights with new, higher-intensity and higher-efficiency bulbs that will allow plant staff to reduce the number of UV light racks in use from 11 racks to 7. This represents a significant leap forward in terms of the plant's overall efficiency and energy use.
- Any byproducts of water treatment at the Woodland Plant that are not recycled and fed back into treatment process are filtered out of the plant system. The "waste sludge," as it is known, is hauled away by truck for disposal at a Passaic Valley Sewerage Commission (PVSC) facility in Newark. According to our guides, that waste is no longer incinerated as it was in 2006. GSWA

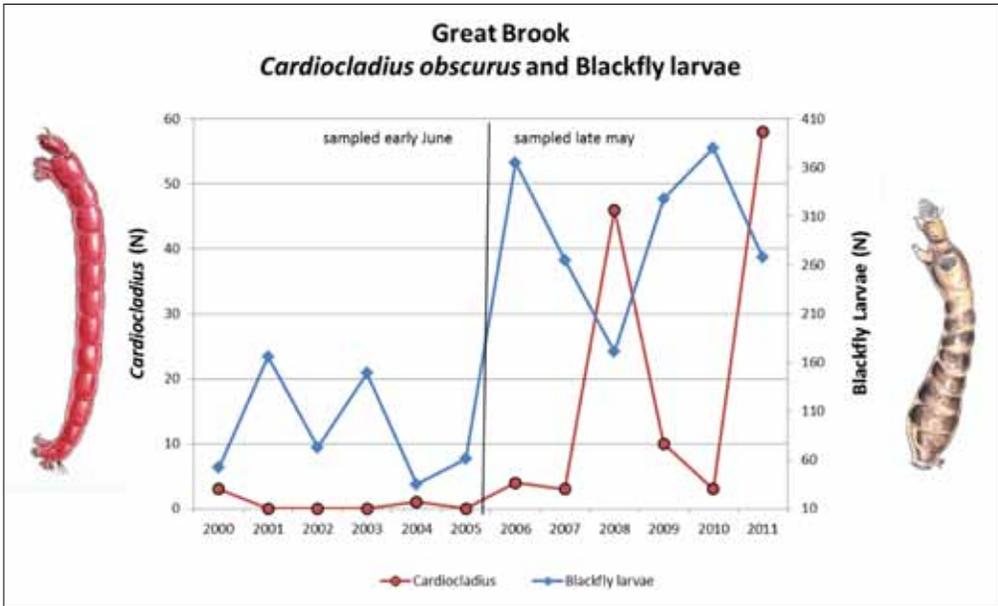


A comparison photo of sewer water coming into the Woodland Plant (left), and treated water leaving the plant (right). Photo by L. Kelm.

staff members have sent inquiries to PVSC in order to determine what happens to the waste sludge after arriving in Newark. We are planning a trip to the Passaic Valley Sewerage Commission for early September and will hopefully have this question answered as we tour their facility.

If you're not sure you understand all the biological and mechanical processes involved in the treatment of wastewater, we strongly encourage you to read (or reread) the article about the Woodland Plant written by our Science and Technology Committee in 2006. (Once again that article is posted online at www.GreatSwamp.org.) Otherwise, we hope you've enjoyed catching up on all that's happening at one of our local wastewater treatment plants! Our sincerest thanks go out to Mark and Joe for leading this year's tour. 🌱

Macroinvertebrates *(continued from page 27)*



The shift in sampling from early June to late May beginning in 2006 moves the sampling date closer to the varying point of blackfly metamorphosis from larvae to adults. This means there are more larvae in samples during the earlier sampling dates (from 2006 on). The more blackfly larvae, the more we can see its relationship to cardiocladius. Chart created by L.W. Pollock, 2012.

population. Over time, the prey population will recover and the cycle will begin all over again. Along Great Brook, the relationship between blackfly and chironomid larvae shows a similar pattern. This influences the B-IBI score because calculated factors of species dominance and the presence of predators vary along with fluctuations in blackfly and chironomid populations.

What all of this tells us is that the B-IBI index, while not perfect, can be incredibly

useful for pinpointing changes at a site over time, and for comparing one site to another. By combining this scoring system with Dr. Pollock's years of sampling experience, we come away with a thorough picture of water quality within the streams of our watershed.

To see short summaries of each MIV sampling site, see Dr. Pollock's most recent presentation on survey findings from 2011, or read his read his full report at www.GreatSwamp.org. 🌲

Interested in volunteering?

Fill out our volunteer profile at www.GreatSwamp.org/VolProfile.htm, or e-mail volunteer@greatswamp.org.

Got Some Time? Volunteer!

There are lots of ways to help GSWA protect our waters and our land. Here are two upcoming opportunities for you, your family, and your friends to become GSWA volunteers. Please register online at www.GreatSwamp.org if you plan to attend either of these fall events.

Both of our scheduled volunteer events include outdoor components. Please dress for the weather. Conditions may be wet and muddy. Long pants and sturdy shoes or boots are strongly recommended. Long sleeves are optional, but recommended. Feel free to bring your own water in a reusable water bottle.

From time to time, GSWA staff will call on volunteers to assist with additional land stewardship, water quality testing, and fundraising tasks. Impromptu calls for volunteers are distributed via email on an “as needed” basis. If you would like to be added to our volunteer email list, or you would like more information about volunteering with GSWA, please call us at 973-538-3500.



Morris County Park Commission's Geoff Knapp (center) works with GSWA volunteers Aseel Zidat, Mariluz Arroyo, and Eddie Rivero to place a deer exclosure fence around new native plants near Seaton Hackney Stables at Loantaka Brook Reservation. 18 March 2012.

Volunteer Stream Restoration Saturday, September 29, 9 a.m.—noon

Location to be determined. Please register for additional info.

Want to get outside and get your hands dirty? Join GSWA's Director of Water Quality Programs Laura Kelm for this outdoor work-day event! We'll be doing some maintenance at one of our recently planted, vegetated stream buffers. That means we'll be removing a lot of invasive plants and sprucing up some of our deer fencing. Location information will be announced as the event date draws near. Please register online at www.GreatSwamp.org to receive updates.

Stream Assessment Training for Volunteers Sunday, October 21, 9 a.m.—noon

GSWA Office, 568 Tempe Wick Rd., Morristown, NJ

Volunteers are always needed to assist GSWA staff with visual assessments of stream health at locations throughout the Great Swamp Watershed. This training session will teach you how to evaluate stream conditions by observing environmental factors like stream bank erosion, nearby land-use issues, and stream flow. This is an indoor/outdoor event. Begin the session indoors by covering stream assessment basics with your instructor. After the presentation, class moves outdoors to practice assessment skills and tasks. Indoor space is limited, so please register online at www.GreatSwamp.org right now to reserve a space. 🌲

Great Swamp Scavenger Hunt!

On Saturday, May 19, more than 100 people joined GSWA and Northern New Jersey Catchers for the first-ever Great Swamp Scavenger Hunt. The hunt took participants on a one-of-a-kind, 44-mile journey to 17 different sites of natural, cultural, and historic importance spread throughout the watershed we all love and want to protect. Destinations included the Morristown National Historical Park at Jockey Hollow, the Great Swamp National Wildlife Refuge, The Raptor Trust, and the New Jersey Audubon Society's Scherman Hoffman Wildlife Sanctuary.

After answering as many questions as possible about each site, our scavenger hunters gathered near Kitchell Pond at Loantaka Brook Reservation to compare scores, claim some fabulous prizes donated by our event sponsors, and enjoy a barbecue under sunny skies.

We cannot thank our scavenger hunt sponsors enough. With the support and generosity of PSEG, PNC Bank, Basecamp

Adventure Outfitters of Bernardsville, REI East Hanover, and Blue Ridge Mountain Sports of Madison we were able to offer several excellent prizes—including tents, field guides, and other outdoor gear—and our hungry competitors were able to receive their fill of burgers, hot dogs, and drinks at the end of the day.

We also want to thank all the event partners who welcomed all of our scavenger hunters onto their properties with open arms. We are proud to have brought the Friends of the Great Swamp National Wildlife Refuge, the Harding Land Trust, the Morris County Park Commission, the National Park Service, the New Jersey Audubon Society, The Raptor Trust, the Somerset County Park Commission, and the U.S. Fish and Wildlife Service together to help raise more awareness of the Great Swamp Watershed and all of the educational and recreational opportunities it has to offer.

See you next year at our second Great Swamp Scavenger Hunt! 🌲



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