Great Swamp Watershed Association
The Passaic River WATERKEEPER® ALLIANCE Affiliate

Across the Watershed

Fall-Winter 2025-2026

WATERKEEPER® ALLIANCE AFFILIATE

ACCREDITED LAND TRUST ACCREDITATION COMMISSION

Protecting our Waters and our Land for More Than 40 Years

An Introduction to Light Pollution

By Ginger VanRyzin, Manager of Stewardship and GIS Specialist

When the word pollution comes up in conversation, we often think of poisoned rivers, hazy skies from car emissions, or plastics littering our beaches and oceans. Often, one of the most preventable types of pollution, light pollution, does not come to mind. Sandwiched between New York City and Philadelphia, light pollution bleeds into every corner of New Jersey, with most people fully unaware.

Darkness is critical for nocturnal animals, who have evolved to function best at a time that many do not. Bats use echolocation, bouncing sound waves throughout the night to locate objects and, most importantly, their prey. Unlike human eyes that evolved with great detailed vision in the daylight, owl eyes are adapted for dark conditions due to a higher ratio of rods (photoreceptor cells that are active in low-light conditions) than cones (photoreceptor cells responsible for color and detailed vision that require light) when compared to the human eye. Even the prey of an owl, a mouse, has long whiskers to detect items that might be in its path.

Due to our poor night-vision, humans tend to fear the dark, since nocturnal wildlife is much better adapted and leaves us in a potentially vulnerable position at night-time. Although here in New Jersey we do not have dangerous predators stalking our nightly walk, other than the occasional black bear looking for food scraps, our early ancestors had prehistoric predators like saber-toothed cats or giant hyenas threatening their tribe each night. Luckily, roughly

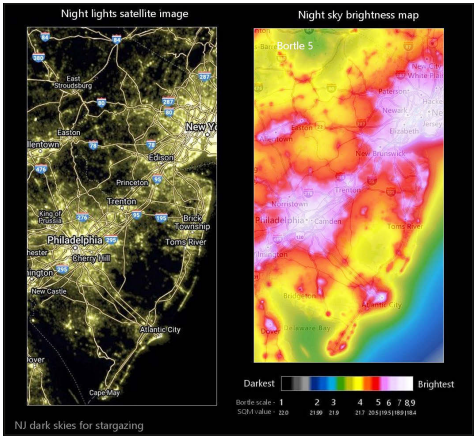

Figure 1. Light pollution in NJ. Source: go-astronomy.com

one million years ago early humans began to master fire; providing warmth, protection, and sight at night. Fast forward to today, we light up the streets and parking lots so we can see the road ahead of us, we light our homes so we can stay up past sunset, and we even light up entire sports fields so that the sun doesn't curtail the sports season, all while areas

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It's Never Too Late to Protect Natural Areas

By Bill Kibler, Executive Director

Clean water is one of the cornerstones of life. It's the basis of healthy living, healthy communities, and even a healthy economy supporting fishing, tourism, recreation, and manufacturing. You may have heard the saying: No water, no life.

You can get a good idea of the water quality of an area by looking at a satellite image of that area. You're looking for intact forests. Communities with significant amounts of intact forests typically have high water quality. As forests disappear and high-density development takes their place, water quality is compromised. There's a reason why New York City relies on the protected forests of the Catskills, and the City of Newark relies on the protected forests of the Highlands – it's for clean drinking water. Healthy forests ensure clean water.

Forests are easy to see, and most people appreciate them. We tend to forget about soil because it's under our feet; almost invisible most of the time. But healthy soils are the very foundation of clean water. The soil under our feet is a massive living ecosystem that serves many vital roles. It helps retain water after it rains, limiting stormwater runoff and flooding. It also acts as an astonishingly effective filter, helping to purify water as it finds its way into streams and reservoirs, and as it infiltrates its way down into the aquifers.

Forests help protect the soil by preventing erosion from wind and water. They help build and enrich the soil by contributing leaves and other organic matter. They then help manage water by absorbing and filtering water while also retaining crucial moisture in the soil. We need healthy forests to ensure we have healthy soils. We need healthy soils to ensure we have healthy forests. We need both healthy soils and healthy forests to ensure we have plentiful, clean drinking water.

Now, one of the last intact forests in Essex County is under threat of being bulldozed and replaced with a nearly 500-unit apartment complex. The Watchung Mountains run through West Orange, and include steep slopes, dense forests, and vital wetlands. Although similar development proposals failed in 2006, 2007, and 2015, the forest is again in the developer's crosshairs. The most recent proposal includes 100 affordable housing units in the plan. Dense development on this site means the loss of a vital intact forest, and increases the risk of flooding from steep slopes, the loss of important soils, and irreparable damage to critical wetlands.

Affordable housing must also be sustainable housing.

We cannot continue to build in this state without regard to the effects on our health and our environment. We cannot surrender the healthy soils and healthy forests that we rely on for healthy water.

The West Orange Planning Board has hearings scheduled on this proposal. GSWA is working with local citizens in an effort to protect this remaining forest in order to protect their community and to protect clean water for all of us.

It's never too late to protect natural areas, and GSWA will continue to fight to protect our communities in the Great Swamp.

Across the Watershed

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GSWA is a member-supported non-profit organization that protects the waters and the land of the Great Swamp Watershed and Passaic River region.

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GIVE WITH CONFIDENCE

In This Issue:

Upcoming Programs and Events

Registration: Unless otherwise noted, registration is required.
Visit *GreatSwamp.org/events*, scan the QR code,
or call 973-538-3500.

Scan to Register

Green Carpet Gala and Silent Auction

Thursday, October 23, 6-9:30pm
(VIP Cocktail Hour 5-6pm)

Brooklake Country Club, 139 Brooklake Rd., Florham Park

We're rolling out the green carpet!

Get ready for an unforgettable night at our Green Carpet Gala and Silent Auction! Join us for a unique awards-style fundraiser as we celebrate the incredible Julia Somers, a lifelong environmental advocate and the founding executive director of GSWA.

We're thrilled to announce that comedian and actor Chris Gethard will host the evening, bringing his signature humor to the stage. The night promises to be packed with entertainment, including a roast of Julia Somers, a unique vegan challenge, and our highly anticipated silent auction.

This isn't just a night out—it's a big night out with an opportunity to come together and support a healthier, brighter future for our watershed. Grab your tickets, get ready to walk the green carpet, and join us for this can't-miss event!

Members Only Fall Migration Hike

Saturday, November 1, 9:30-11:30am

Garret Mountain Reservation, 8 Mountain Ave, Woodland Park

GSWA members ONLY! Come out to enjoy the tail-end of bird migration (pun-intended!). On our hike we cover roughly 3 miles of trails with some elevation change. On our way, we may catch some late fall migrants including sharp-shinned hawks, northern harriers, black and turkey vultures, and if we are lucky, maybe even a golden eagle! This event is free-a $5 donation per person is appreciated.

Veterans Day Beginner-Friendly Paddle

Tuesday, November 11
Session #1: 9:30-11am
Session #2: 12-1:30pm

Somerset County Park Commission, Fisherman's Parking, Basking Ridge

Come out and enjoy the beautiful fall foliage leisurely as we paddle the middle region of the Great Swamp. This area is full of wildlife, native vegetation and beautiful views. Come experience all this and more from a magical place - the middle of the Passaic River at the Great Swamp National Wildlife Refuge. Note: Children 8 and up are welcome. All participants 15 and under must be accompanied by a parent. Life vests will be provided. GSWA members: $30, non-members: $40.

Breakfast Briefing: Meet the Mussels of the Great Swamp

Thursday, November 20, 8-9:30 am

GSWA Headquarters, 568 Tempe Wick Rd., Morristown

They might look like humble rocks, but freshwater mussels are the silent powerhouses of our local waterways. New Jersey is home to 12 native species of freshwater mussels, which are excellent indicators of river and stream health. Join us to uncover the secret lives of these living filters and their incredible ability to purify water. We'll also discuss the challenges they face, how the GSWA is working to protect them, and what you can do to

help save these vital bivalves! Registration is required. GSWA members: Free, non-member adult: $10, non-member Child: $5.

Pre-Thanksgiving Day CMA Cleanup

Sunday, November 23, 9am-1pm

GSWA's CMA, 1 Tiger Lily Ln., Harding Twp.

This is a great opportunity to preemptively give back before Thanksgiving! We could use your help putting our 73-acre wetlands reserve to bed for the winter. At the Conservation Management Area (CMA) there's no shortage of things to accomplish on our honey-do list. We need to mulch and edge our trails, haul out old boardwalk lumber, clean up our seating areas, and more. A crisp, autumn morning is a fabulous time to get outside and get your hands dirty. We will provide you with all the tools you need to participate for as long as you like!

Make a Winter Wreath Workshop

Monday, December 1
Two Sessions: 5-6:30pm & 7-8:30

GSWA Headquarters, 568 Tempe Wick Rd., Morristown

It's not winter until the wreath is on the door. Come craft a homemade winter wreath made from native evergreens and other native plants. You'll decorate your masterpiece with pinecones, berries, and other items found in nature. While your creativity blossoms, you'll learn more about the natural items being used in this craft. Price covers everything you need to leave with a finished piece that's ready to hang on your door or give as a gift. GSWA members $40, non-members $45.

Winter Hike at Jockey Hollow

Saturday, December 13, 10am-12pm

Morristown National Historical Park's Jockey Hollow Visitor Center, Morristown

Join us for a fun and informative nature hike through Jockey Hollow before the holiday rush begins! This family-friendly adventure will take you through a potentially snowy forest where we'll look for animal tracks and discover where they lead. We'll learn about how local wildlife survives the winter, their activities, and how they prepare for the spring thaw. This is a great opportunity for budding nature enthusiasts of all ages to meet others and learn some cool facts about the environment. GSWA members: adult $10, non-member: adult $15, all children: $5

Nature Detectives Hike

Sunday, January 11, 2026, 10am-12pm

Great Swamp National Wildlife Refuge Orange Trail, Meyersville Rd., Green Village

Ever wondered how to tell what animals are visiting an area without actually seeing them? Join us for a hike where you'll learn to become a wildlife detective by investigating the clues our native critters leave behind. We'll show you how to identify animals by their scat (yes, poop), tracks, and other markers. You'll be amazed at the fascinating stories these signs can tell! We'll provide binoculars and poking sticks to help us get a closer look. This is a great opportunity to explore the Refuge in a new way. Recommended for all, but especially children 5 to 12 years old. This event is free, but a suggested donation is appreciated to help offset staff time: Adult $10, Child $5.

For more information on upcoming events and to register, visit ***GreatSwamp.org*** or call ***973-538-3500***.

Most events are free or a reduced rate for GSWA members.
Unless otherwise noted, registration is required.

Nature: Innovating for Billions of Years, No Patents Required

Play the Intuition Game

By Val Thorpe, Director of Operations

When looking for design solutions, nature is the original R&D department. So why reinvent the wheel when billions of years of evolution have already done the work for us? (Note, the wheel is a poor example – it's considered a purely human invention.) Nature has inspired many everyday (and not-so-everyday) inventions through an approach called *biomimicry.*

Ready to test your intuition? Match the invention (in blue) with the correct inspiration (in green) by writing the number the green column. There's only one correct answer for each. Check your score and learn about these clever biomimicries on page 24.

	Invention		Inspired by
1	Sticky Tape		Spider Webs
2	Faster Swimmers		Humpback Whale Fins
3	Anti-Glare Screens		Termite Mounds
4	Velcro		Shark Skin
5	Bullet Trains		Moth Eyes
6	Self-Cleaning Surfaces		Burdock Seeds
7	Wind Turbines		Lotus Leaves
8	Building Ventilation		Namib Desert Beetle
9	Water Harvesting		Gecko Toes
10	Bird-safe Glass		Kingfisher Beaks

(continued on page 24)

Has your email address changed?

Please let us know! Send your name, address, and old email to *info@GreatSwamp.org* to ensure you continue receiving our informative eNewsletters.

American Water Charitable Foundation Supports GSWA's Downstream Water Quality Sampling Expansion

By Lynne Applebaum, Director of Institutional Relations

In 2016, GSWA expanded our mission beyond the Great Swamp watershed to include all 80 miles of the Passaic River, with a new mission statement: "The mission of the Great Swamp Watershed Association is to protect and improve the health of the Passaic River through science, education, land preservation, and advocacy." With this expansion came new programming and initiatives which addressed the unique character and challenges of the lower Passaic communities. These challenges include more highly developed urban centers and the toxic legacy of industrial pollution.

In April 2025, GSWA received funding to support this effort from the American Water Charitable Foundation, a philanthropic non-profit organization established by American Water. the largest regulated water and wastewater utility company in the U.S., supporting high-impact projects and initiatives that further American Water's commitment to the communities it serves.

GSWA is committed to serving all who live, work, and play in the Passaic River region. Thanks to the funding we received from American Water Charitable Foundation, GSWA is researching the addition of 4 to 5 new water quality sampling sites in the lower Passaic region reaching from Dundee Dam in Garfield to Newark Bay in the iron-bound section of Newark.

The funding we have received from American Water will allow GSWA to complete our downstream expansion of data collection along the Passaic River. As we continue to learn about the varied impacts along the length of the river, this data-based knowledge allows us to work with local communities to protect and improve the water quality that we all depend on," comments Sandra LaVigne, GSWA Director of Water Quality Programs.

These sites will be added in 2026 as our final research expansion of the water quality in the Passaic River which started in 2016. This section of the Passaic is part of an ongoing Comprehensive Environmental Response, Compensation, and Liability Act remediation surrounding the Diamond Alkali Superfund Site. Our monitoring will help us to track the changes to the river as the clean-up progresses. At these sites, we will monitor for a wide range of chemical parameters including nutrients *(continued on page 23)*

From left to right: Bill Kibler, GSWA Executive Director; Sandra LaVigne, GSWA Director of Water Quality Programs; and Shealynn O'Toole, Source Water Protection, Program Manager at American Water.

GSWA Plans Final Expansion for Water Quality Data Collection Along the Lower Passaic River

By Sandra LaVigne, Director of Water Quality Programs

As we wrap up our sampling for 2025, we will have completed year three of our third downstream expansion. After 35 years of protecting and monitoring the headwaters of the river, in 2016, our Board of Trustees and staff made the commitment to work to protect the entire length of the river for generations to come. Part of this expansion included expanding our water quality data collection below Millington Gorge, our historical end point. Our first data collection expansion (2017 – 2019) brought us as far as Livingston and the second (2020 – 2022) went as far as Little Falls. From 2023 through 2025 we completed our third expansion encompassing the River from Little Falls to Dundee Dam.

Starting in 2026, we will begin the final expansion bringing us down to Newark Bay. The lower region of the Passaic River flows through areas of industry, urban development, and historic pollution. But it also has

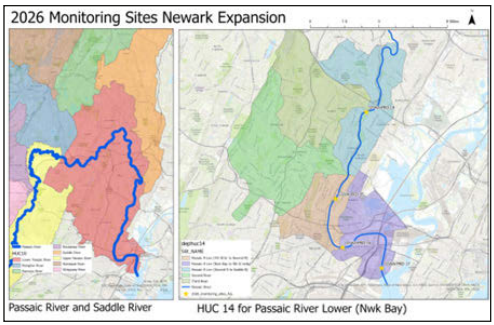
Figure 1: Newark River Front Park, Newark, NJ

many areas of beauty; parks, boating clubs, and historic sites. As with our last expansion, which encapsulated Paterson's combined sewer outfalls (CSO's), this expansion will include more areas impacted by CSO's including Kearny, Newark, and Harrison townships. The most notable issue along this last stretch of the Passaic River is, of course, the Diamond Alkali Superfund site. Our planned final expansion for data collection lies entirely within the area designated under the superfund, which runs the length of the river from Dundee Dam to the mouth of Newark Bay,

Figure 2: Dundee Dam, Garfield, NJ

approximately seventeen and a half miles.

In the 1950s, '60s, and '70s Diamond Alkali owned and operated a chemical plant in Newark which produced agricultural chemicals including Agent Orange, a strong defoliant used in Vietnam. One of the bi-products of this manufacturing was a toxin called dioxin. Through the manufacturing process this toxin was released into the ground in Newark and into the waters of the Passaic River. As the Passaic River is influenced by tidal movements, the contamination spread upstream until it reached as far up as Dundee Dam where the dam prevented further spread. The lower 17.5 miles of the Passaic River was listed in 1984 as a superfund site under the Comprehensive Environmental Response



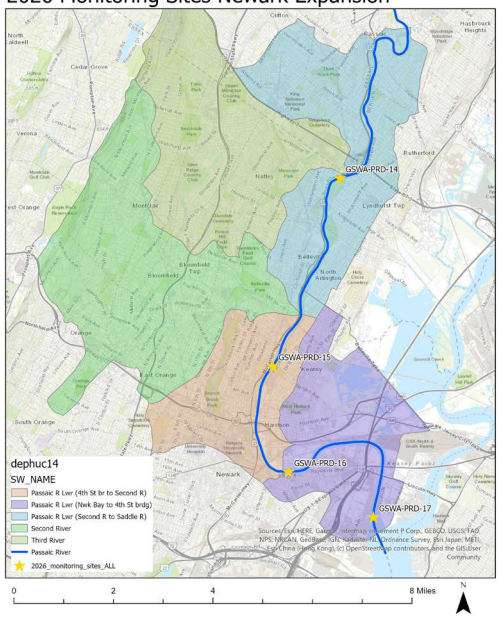
Compensation, and Liability Act (CERCLA). Since that time the USEPA, NJDEP and the local community have been working towards a clean-up solution.

When we began looking at this last expansion, we utilized the NJDEP designations of sub-watersheds within the larger region to help us determine what the best locations for our new sampling sites would be. Each of the four new locations represents the ability to capture data from a given area and assess its impacts on the water quality. By using these topographical areas, we are better able to determine where any issues could be originating and to see how the water quality changes as it moves through each region. Below you can see the four new sites marked on the map. From top to bottom (or upstream to downstream) the sites are:

- **GSWA PRD14** – Boat Launch at Riverside County Park, Lyndhurst, NJ. This site will allow us to assess the impacts of the confluence of the Third River with the Passaic.
- **GSWA PRD15** – Kearny Archery Park and boat Launch, Kearny, NJ. This site will capture the impacts of the Second River confluence.
- **GSWA PRD16** – Passaic River Park, Iron Bound, Newark, NJ. This site will help us to look at the impacts of the industry along this area of the river and the increased impervious cover from the surrounding areas.
- **GSWA PRD17** – Passaic River at Newark Bay. This will be the farthest downstream site we sample. We are excited to say the Hackensack Riverkeeper will assist us in collecting data at this location.

As GSWA begins our exploration of this portion of the Passaic River, we look forward to learning more about the rich history of the region and using our water quality data to help the communities in this area to improve their understanding of what is impact the river and how we can all work together to help the river be resilient for generations to come.

2026 Monitoring Sites Newark Expansion



Secrets in the Stream: Freshwater Mussels

By Alex Sloane, Water Quality and Education Associate

Lurking in the peaceful streams and winding rivers of the Passaic River watershed is a creature so secretive and surprising that many people don't even know they're there, yet they contribute immensely to local food webs and high-water quality. I am talking, of course. about freshwater mussels! Freshwater mussels, specifically those in the family *Unionidae*, are a highly imperiled group of freshwater mollusks that were once common throughout the Passaic; they even sparked a pearl craze in the late 1800s (you can see Passaic pearls for yourself at the Paterson Museum)!

There are 12 mussel species native to New Jersey and 300 species native to North America. Mussels are filter feeders, meaning they draw water in, filter out nutrients, detritus, and algae, and expel the filtered water back into the stream. This feeding behavior, coupled with their burrowing activities, helps clean the water and cycle nutrients and oxygen through the aquatic ecosystem. They are also preyed upon by many river creatures such as raccoons, otters, turtles, minks, and certain fish like the freshwater drum.

Figure 1. Freshwater mussels found by GSWA staff during MIV sampling.

Unlike their marine counterparts, they do not attach themselves to hard surfaces but rather bury themselves in the substrate. They also have a unique, partially parasitic lifecycle which enables them to colonize entire new sections of stream - unique for a bivalve! Fertilization happens internally, and the females release their glochidia, or larvae, into the water where they attach to passing fish. Different mussel species rely on different host fish species for this part of the lifecycle. Some mussel species only have a few known host species while others are much more generalist. The glochidia live in the gills of their host (irritating, but not dangerous for the fish) until they develop into juvenile mussels. They'll then drop off the fish and bury into the sediment of their new area.

So, if they can travel so easily, why aren't our streams full of mussels?

Research has shown that many mussel species are sensitive to abnormal levels of nutrients (nitrogen and phosphorous), salinity, habitat, and stream flow alterations. These are issues that impact all the organisms in our streams and rivers, though to varying degrees, based on species and genus. GSWA conducts annual macroinvertebrate (MIV) samplings throughout the watershed to assess abundance and diversity of the MIV species and, utilizing the High Gradient Macroinvertebrate Index, assign a score to the site based on the intolerance of environmental and anthropogenic stress of the MIVs living there. Macroinvertebrates include insects and their larvae, mollusks, crustaceans, and worms, to name a few. Certain organisms are sensitive to certain parameters, for example, caddisflies are somewhat tolerant of anthropogenic stressors but are very intolerant of

low dissolved oxygen, so having a diversity of species and a diversity of sensitivities help paint a more complete picture of the long-term water quality.

As sedentary filter-feeders, mussels are more susceptible to habitat alterations such as substrate, flow, and temperature changes. These elements are also influenced by terrestrial habitat features such as canopy cover, vegetative buffer size and quality, and sinuosity/channel alteration. As we see higher temperatures and increased precipitation due to climate change, these habitat elements will become even more essential to resilience, and not just for the mussels! Many other organisms such as brook trout, slimy sculpins, and stoneflies (one of our MVP MIVs!) rely on cooler water temperatures to complete parts of their lifecycles. Canopy cover helps keep the water temperatures cooler and more stable; this also helps maintain higher dissolved oxygen levels and reduces algae and bacteria growth. Vegetative buffers along the edge of the stream and on the banks help filter, absorb, and slow rainfall as it makes its way into the stream – this reduces the amount of run-off (nutrients, bacteria, road salt, litter etc.) entering the water as well as reducing bank erosion and siltation, homogenization, and scouring of benthic habitats. Sinuosity in a stream channel can help slow the water as it moves downstream. This reduces erosion and maintains the diversity of in-stream habitats.

Figure 2. Slimy sculpin (Cottus cognatus) found by GSWA staff while MIV sampling.

Research suggests that there is a strong connection between mussel presence and habitat quality, and monitoring and restoring terrestrial and in-stream habitat is a large part of GSWA's work. There are ways you can help the mussels as well! Taking care of our waterways isn't just about habitat restoration (though that is important!). Putting less stress on our aquatic ecosystems can look like shoveling less or using alternatives to rock salt on roads and walkways, picking up pet waste, planting native plants to slow the amount of water entering the stream after a storm, and reducing the amount of invasive species that escape into the wild and degrade riparian buffers. Even if you're not ready to rip up all your grass and plant natives instead (but if you are, GSWA hosts an annual native plant sale that can help you with that!), avoid using fertilizer and herbicides which can wash into streams or catch basins.

If you are interested in seeing how our streams have been doing over the last few years, visit *greatswamp.org/water-quality-report-cards* to see the results of our water quality monitoring program. We look at chemical parameters, visual habitat data, summer bacteria levels, and macroinvertebrate survey results to assess both long- and short-term water quality of our watershed. If you want to get even more involved in monitoring and protecting water quality in your community, we offer multiple water quality and stewardship (remember, terrestrial habitat is important too!) volunteer opportunities throughout the *(continued on page 19)*

Climate Change Education Offered by GSWA Staff – A Match for our Mission

By Hazel England, Director of Education, Outreach, and Land Stewardship

Summer 2025's bizarre weather events of huge deluges in localized areas, early heat waves, and even fall \-like temperatures experienced in August have unfortunately provided the perfect backdrop of teachable moments for the climate change education for teaching professionals we have been conducting at GSWA. If what is occurring in New Jersey were not enough to convince climate change sceptics, a glance any day at world weather headlines confirms the extreme unprecedented nature of what we are now experiencing: catastrophic floods in southern Europe coupled with cripplingly high temperatures which fanned large scale fires, biblical deluges in Asia, glacial melt so extreme floods have ensued, washing away communities that had existed at those sites for millennia.

The impacts of a warming planet are being felt across the globe. This summer's weather headlines are being fueled primarily by high ocean surface temperatures, especially those of the western Atlantic, which are in uncharted high territory. The data provided by jarring high intensity maps of surface ocean temperature shows deviations from long-term averages produced by the scientists at Climate Central, a policy neutral nonprofit organization of independent scientists who research the facts about changing climate and how it affects people's lives (*csi.climatecentral.org/ocean*).

At our CMA, students learned photosynthesis firsthand. We calculated the tons of carbon a single tree can store, ID'd the species, measured the circumference, and noted the growing conditions. An online app determined exactly how much carbon that tree was sequestering.

Impacts including extreme weather events caused by earth's warming due to climate change are real and being felt by many area residents on a very personal level. Most scientists agree that climate change impacts are severe, caused by human actions leading to increased carbon dioxide concentrations in our atmosphere, and requiring concerted action -- and urgent action at that -- to prevent additional warming.

The state of New Jersey produced a climate impact report in 2020 which shows that the state is warming faster than most other parts of the world, leading to increasing sea-level rise, more intense rainfall and flooding, and increased extreme heat [*dep.nj.gov/climatechange/mitigation/80x50-report*]. NJDEP's report on how New Jersey can become more resilient by outlining adaptation measures makes sober reading for the magnitude of the changes we must make to address the impacts we will experience [*dep.nj.gov/climatechange/mitigation/cprg*].

New Jersey's Department of Education took this information and used it to create climate aligned student learning standards to incorporate climate change education into the curriculum and classrooms around the state. We are the first state in the nation to in-

corporate climate learning standards from kindergarten -12th grade across all subject areas, not just into science class. The standards rolled out in 2020, and unfortunately, with the COVID-19 pandemic occurring at the same time, they have been slow to be implemented. These teaching standards are important; they give educators guidelines for what is expected that their students know and create students who are increasingly climate-literate and focused on implementing the kinds of actions in their communities that will help us become more climate resilient as a state.

Some Passaic River communities flood frequently leaving residents with huge quality-of-life and economic impacts. GSWA created two interactive flood models representing this repetitive flooding. Teachers chose their preferred location to build their house, then applied repeated 1" rain storms to see how rivers don't always stay in their floodplains and the impact of development in 10, 100, or 500 years.

In 2024, to help educators connect with the standards more meaningfully, the Department of Education (DoE) created the Climate Change Learning Collaborative, a grant-funded program consisting of four academic hubs around the state based at Ramapo College and Rutgers, Monmouth, and Stockton Universities, partnered with local community-based organizations. GSWA was selected to partner with Ramapo College, serving the seven northern counties of NJ (Bergen, Essex, Hudson, Morris, Passaic, Sussex, and Warren). The School of Conservation and the Meadowlands Education Center also partnered with Ramapo, and together, these organizations served as the teacher-facing portion of the grant.

Throughout the summer and into the school year, we worked hard to create new programs of place-based experiential education for professional development workshops and field trips for NJ public school educators and their students. Pulling from our work supported by data from throughout the Passaic River region, we could show the effects of increasingly strong storms on our region's communities. There are strong ties in this work to our existing Watershed Friendly Living programs which focused on ways to reduce stormwater runoff, improve water quality, and maintain and improve area biodiversity through education and behavior change. We were already teaching students how to assess water quality through chemical and biological sampling and examine the ecosystem services offered by forests on our Conservation Management Area ecological field trips. We were in classrooms educating about ways schools can implement green infrastructure solutions to recharge aquifers and reduce flood impacts in urban areas, so modifying the content to more thoroughly include climate science was not a stretch!

During our first pilot year, GSWA offered 15 workshops and six field trips for students. It was hard work with tight turnarounds (it sometimes felt we were flying the plane as we were building it), but the learning for all was huge! We were thrilled when the DoE confirmed a second year of the CCLC program. Year two began

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Support Through Planned Giving

By Nancy Rago, Membership and Social Media Manager

Imagine your values living on long after you are gone—not just in memories, but through lasting impact. Estate planning is not only about protecting assets or caring for family, but also a powerful way to ensure your ideals shape the future.

September, recognized as *Environmental Awareness Month*, is the perfect time to reflect on the legacy you will leave behind. By updating or creating your will, you can secure peace of mind, provide for your family, and support the causes that inspire you.

Why Estate Planning Matters

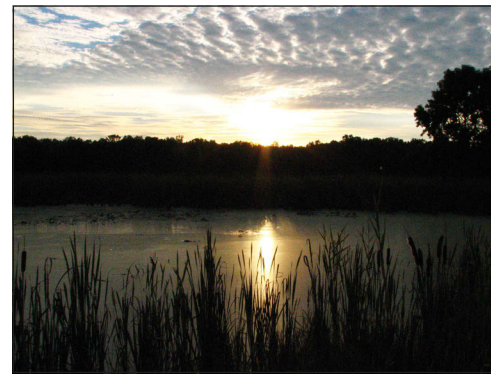
Estate planning means making thoughtful decisions about how your assets are distributed, who will care for dependents, and how charitable wishes are honored. Without a will, the state's intestate succession laws determine how your assets are distributed. With a little pre-planning, your estate plan can be carried out according to your wishes and priorities, protecting your family and safeguarding your legacy.

Creating a Greener Legacy with GSWA

Including the *Great Swamp Watershed Association (GSWA)* in your estate plans is a deeply meaningful way to extend your impact. Planned giving helps protect clean water, open space, and healthy communities by:

- Sustaining water quality monitoring
- Expanding environmental education programs
- Supporting land stewardship and advocacy.

Stacey Valentine, GSWA Board Member and Managing Partner at Avelino Law, handles income, estate, inheritance, gift, and generation-skipping transfer tax issues through the law firm, helping clients maximize the benefits of their charitable giving. Stacey reminds clients: *"Planned giving is not only about protecting your family; it's about leaving a lasting imprint of the values you hold dear."*



Sunset over the Great Swamp National Wildlife Refuge, NJ. Captured by Dalton of Dog Company, this photo reflects his favorite visits here—especially on warm summer nights when the air hums with crickets, bullfrogs call from the wetlands, and the swamp comes alive with sound and movement.

The Tax Benefits of Legacy Giving

Planned giving is both a powerful way to protect the environment and a smart financial decision. The One Big Beautiful Bill Act (OBBBA) has permanently doubled federal estate, gift, and generation-skipping transfer tax exemptions. This means more of your legacy can support the causes you love—like safeguarding clean water and open space—instead of going to taxes.

With these higher exemptions, charitable contributions can also help keep your taxable estate from growing over time. Federal and state estate *(continued on page 26)*

Forever Chemicals: New Research Maps PFAS Contamination Patterns Across New Jersey's Watersheds

By Odera R. Umeh and Dr. Duke Ophori, Department of Earth and Environmental Studies, Montclair State University, Montclair, New Jersey, USA, 07043

The Silent Threat in Our Water

Imagine chemicals so persistent they're called "forever chemicals" – substances that do not break down naturally and accumulate in our environment and bodies over time. These are PFAS (per- and polyfluoroalkyl substances), and new research reveals they are somewhat present in New Jersey's water systems.

A doctoral candidate under the advisement of Dr. Duke Ophori at Montclair State University recently completed the first comprehensive statewide study examining PFAS contamination across New Jersey's watershed management areas (WMAs). The findings reveal that at least one PFAS compound exceeds USEPA limits in 85% of the state's watersheds, possibly affecting residents who rely on these water sources.

PFAS have been used since the 1940s in a wide range of products, including non-stick cookware, food packaging, cosmetics, and firefighting foam. Their water-repelling properties made them invaluable to industry, but these same characteristics make them nearly indestructible in nature. Once released, they persist indefinitely, moving through soil and groundwater into our drinking water supplies.

Research Findings: A Watershed-by-Watershed Analysis

The study analyzed water samples from 149 monitoring wells across New Jersey's 20 watershed management areas (Fig. 1). The research investigated 12 different PFAS compounds and mapped their occurrence using advanced geospatial and Python tools.

Most Contaminated Areas: The Arthur Kill watershed emerged as the most severely impacted, with total PFAS concentrations averaging 187 ng/L. The Upper Passaic, Whippany, and Rockaway watersheds ranked second, followed by the Rancocas watershed (Fig. 1). These areas share common features: high population density, extensive industrial history, and aging infrastructure. Additionally, it was observed that the Northeast is the most polluted region, followed by Raritan, while the Northwest is the least.

Least Contaminated Areas: The Assiscunk, Crosswicks, and Doctors watershed showed the lowest PFAS levels at 19 ng/L (Fig. 1). The Wallkill and North and South Branch Raritan watersheds also showed relatively lower contamination (Fig. 1).

The Dominant Culprit – PFOA: Of all PFAS compounds detected, PFOA (perfluorooctanoic acid) was the most prevalent, contributing 23% of total PFAS contamination statewide, while PFDA is the least studied compound (1.9%). PFOA, formerly used in Teflon production, exceeded EPA limits in 85% of watersheds studied. Short-chain PFAS compounds, once considered "safer alternatives," were also found at concerning levels, suggesting that these industry replacements may not be the solution hoped for.

The Dominant Source: It is Not Airports and Military Facilities

While many assume airports and military facilities are the primary PFAS sources due to firefighting foam use, this study revealed a different story. *(continued on page 28)*

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GSWA Advisory Council Spotlight: Anthony DellaPelle

By Wade Kirby, Director of Development

Anthony "Tony" DellaPelle is the son of first-generation Americans. His family lived in Newark and Irvington and moved to Livingston in 1967 when he was five years old. Tony developed many long-lasting friendships in Livingston during his childhood that have now lasted over 60 years. He played sports throughout school and excelled in math and science courses. Tony's ambitions to attend Franklin & Marshall College in Lancaster, Pennsylvania were because he wanted to become a doctor, however, by his sophomore year, he shifted his interest toward the law. A favorite summer job of Tony's was his role as a doorman in New York City. The money was great, he was able to work during winter and spring vacations, and there was always a parking space!

Anthony "Tony" DellaPelle

Tony met his wife Gwenn at Franklin & Marshall during their freshman year, and they have been together since 1982. Following college, he chose Seton Hall Law School. He worked in various law and real estate jobs during law school, including work as a real estate paralegal and also as a title searcher where he learned a lot about history and the families who controlled the real estate industry in this part of northern New Jersey. His first full-time job was at the law firm of Schenck, Price, Smith & King, LLP., where Tony handled a tremendous number of closings and developed a real passion for real estate.

Tony's exposure to land conservation resulted from his land use and zoning work. There was a growing need to preserve land as a way to get certain projects approved. For several years, he worked with other attorneys at Schenck, Price, Smith & King, LLP. who represented the New Jersey Conservation Foundation. Tony gained experience from working on purchasing properties for conservation and obtaining conservation easements and donating land for development projects.

Many of Tony's cases and development projects were in communities around the Great Swamp and included tributaries to the Passaic, Whippany, and Raritan Rivers. Environmental sensitivity was part of his practice so that he could understand the constraints of many projects and cases – it was important to know how the land is changed with development, including managing storm water, addressing run-off from the roads, etc. Proof was needed to handle these issues.

In 1997, Tony's work led him to a case of eminent domain in Warren County where the land occupied by a farm was needed to build a new school. Fatigued by the need for

his constant appearance at evening Planning Board Meetings combined with his young and growing family, Tony came to his current firm, McKirdy, Riskin, Olson & DellaPelle, P.C., to specialize in eminent domain and tax appeals. He is the only attorney in New Jersey elected as a member of the Owners Counsel of America; a national association of leading eminent domain lawyers across the country on which he has served on their Board of Directors. He has also been designated as a member of The Counselors of Real Estate® and served as the Global Chair of that organization in 2024.

Tony also has an extensive history volunteering at his undergraduate alma matter, serving as a Trustee, including President of the Franklin & Marshall Alumni Association and as a member of the College's Board of Trustees, during which time he learned a lot about education. He also served as a trustee of the Morris County Bar Association for several years.

His years of volunteering led to his interest in the Great Swamp Watershed Association, to which he was introduced by former GSWA executive director Sally Rubin, his wife Gwenn, and former Board Chairman Matt Krauser. Tony joined the board, and as his knowledge and respect for the mission of GSWA grew, Tony then became Board Chairman himself. He enjoyed working with former Chairs Matt and Nic Platt. In Tony's words, "the board needs to govern the organization." He served on the search committee which resulted in the hiring of Bill Kibler as executive director earlier this year.

Tony affirms that GSWA's programs are awesome! He knows how well we educate the community with our mission, and he knows as well as we do that the best way to do that is through young people. We are a grateful beneficiary of Tony's wealth of legal experience with real estate, land management, eminent domain, and volunteerism. *Tony, we're so glad you found us!*

Secrets in the Stream: Freshwater Mussels

(continued from page 11)

year, and we couldn't do the level of conservation and monitoring without our dedicated community of volunteers.

If you're interested in volunteering with our stewardship team, email Ginger at *gvanryzin@greatswamp.org*.

If you're interested in volunteering with our water quality monitoring program, email Sandra at *sandral@greatswamp.org*.

To learn more, come to our Breakfast Briefing, *Secrets in the Stream: Freshwater Mussels*, November 20, 8-9:30 am. Register at *GreatSwamp.org*.

MISSION

The Great Swamp Watershed Association protects and improves the health of the Passaic River through science, education, land preservation and stewardship, and advocacy.

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Find Your Perfect Volunteer Opportunity with GSWA!

Come help protect our beautiful watershed have some fun! We offer a variety of indoor/administrative and outdoor/field volunteer opportunities for everyone ages 16 and up. Explore the possibilities at *GreatSwamp.org/volunteer* and raise your hand by emailing *info@GreatSwamp.org*!

In Memory - John Kramer

By Hazel England, Director of Education, Outreach, and Land Stewardship

Our GSWA staff and stewardship crews are still adjusting to the loss of our dear friend, GSWA volunteer, and longtime supporter, John Kramer. John passed away in January of this year. He was 77.

Since our stewardship staff are always spread so thin, we rely heavily on the work and expertise of our internal cadre of stalwart volunteers, and we're happy to number him as one of the "stalwarts". John was a passionate soul - he never met a thicket of multiflora rose or wisteria he did not want to do battle with, clippers in one hand, and herbicide dabber in the other.

John was born and raised in Milwaukee, Wisconsin and brought his mid-western can-do attitude to all his efforts with us.

As a retiree, he was often able to help at our weekday corporate stewardship events. He was excellent at rallying tired corporate volunteers in the afternoons to go back out to the woods and 'just go tackle one more patch of roses', because he thought we could finish the job with just a little more effort!

At our 73-acre Conservation Management Area (CMA) while working alongside John, we would have the most interesting conversations about his life growing up in Wisconsin, his time at U Penn and Wharton business school, his diverse career in business, his sons' sailing exploits, or his battles against the bamboo creeping in from his neighbor's yard. Politics was always a lively conversation, as was learning about his latest skiing adventures, long running Subaru repairs, or his plethora of other projects as a self-confessed 'dabbler'.

While a steadfast volunteer for the stewardship crew, John was also a committed Stream Team member. He could always be relied upon to pick up an extra bacterial monitoring site, head out for chemical sampling, or conduct an extra visual assessment.

We all miss his laughter, his shirts ripped by multiflora rose, and his empathy and kindness which he shared with us over more than a dozen years of Volunteering. Even in his passing, he continues to support GSWA, as his family- Stephanie, his wife of fifty years and his three children made a donation to support our ongoing water quality and stewardship work and through his obituary, he encouraged others to do the same. We will continue to miss John's presence in our work and will raise a Leinenkugel's to him at our October 23rd Gala!

John Kramer

Climate Change Education Offered by GSWA Staff – A Match for our Mission

(continued from page 13)

June 1, and with $62,000 funding for staff and programming, it is a large focus of our time and energy. This year's program sees us again implementing high quality science-based education and enrichment for 5th-12th grade public school teachers and their students to build knowledge about climate change.

On a teachers' field trip, we discussed water quality beginning at Riverfront Park in Newark and working our way upstream, observing how the river changes from sea (Newark Bay) to source (Mendham).

Our grant covers 15 teacher professional development workshops, 9 field trip days for students, 5 in-class climate educational programs, 30 hours of technical assistance for schools implementing CCLC grant-funded projects, and 4 days of school-specific professional development for a single district or building.

Over the course of five weeks this past July and August, more than 160 educators joined us for eight all day Climate Change Professional Development workshops across a variety of specific climate themes. Each day was offered as a stand-alone workshop, but also worked as part of a suite of linked learning experiences for teachers. From general introductions to climate science, to developing climate resilient playgrounds, to utilizing climate fiction as a tool for building learning about others' climate experiences, our workshops spanned a huge range of topics. We focused on making workshop content hands on, with field portions each day and lessons experienced first hand, so teachers gained activities that they can turnkey back into their classrooms.

The content of the workshops focused on how climate change is impacting Passaic River region communities, looking at climate change impacts through the lens of GSWA's own water quality mission. Using data sets GSWA, NJ state climatologists, or the participants themselves collected, we dove into learning about how flooding caused by our communities' increasingly impervious surfaces and precipitation caused by increasingly energetic storms impact the environment and human communities and what solution-focued thinking can implent to mitigate these issues.

Over 160 5th-12th grade NJ public school teachers have attended these first eight workshops. They were all full with waiting lists, which was a great situation to be in, in only our second year! Several more workshops are scheduled throughout the school year, along with workshops offered at specific districts, prioritizing communities along the Passaic including Madison, Paterson, and Little Falls school districts. We are offering newly-designed and modified field trips to engage students in gathering data to explore climate-focused science. Nine schools will attend trips whose costs are fully covered by the grant including busing and GSWA fees. At our CMA

property, they will measure the amount of carbon a single tree can sequester, look at environmental stressors on forests and the economic and environemtnal values they provide. Building the concept of ecosystem servives, students will learn how maintaining trees can help us become more climate resilient. Trips will be offered fall and spring, and more than half of dates are already filled!

Finally, we are offering programs in classrooms to help students understand how current conditions in their communities impact their towns ability to become more climate resilient. Students will learn about repeat flooding, how expected climate changes in New Jersey will impact future weather conditions, and they will work to develop solutions-based thinking by learning about green infrastructure, and other innovative environmental and social justice remediations. Our programming staff is fully engaged in these programs because we realize the importance of creating the next generation of climate-literate decisionmakers in our state as we tackle this huge global problem that directly impacts our current and future quality of life.

For more information or to sign up for workshops or obtain resources visit our launch page at *greatswamp.org/cclc*.

American Water Charitable Foundation Supports GSWA's Downstream Water Quality Sampling Expansion

(Continued from page 7)

like nitrogen and phosphorus, hardness, road salts, and bacteria. Depending on the locations selected, further sampling may include macroinvertebrate sampling and eel monitoring as conditions allow.

"At New Jersey American Water, we're proud to support the Great Swamp Watershed Association's Water Quality Sampling Program expansion into the lower Passaic River region," said Shealynn O'Toole, Source Water Protection, Program Manager at American Water. "This grant represents more than just funding—it's an investment in protecting our source waters and advancing science-based stewardship. By supporting community driven water quality sampling and expanding access to reliable data, we're empowering residents to take an active role in safeguarding our drinking water sources and working towards a more resilient watershed for future generations."

Expanding our downstream water quality sampling program strengthens GSWA's ongoing environmental promise to this region, thanks to supporters like the American Water Charitable Foundation.

Multiply Your Impact: Share This Newsletter!

This *Across the Watershed* newsletter is a treasure trove of information, with articles contributed by the entire GSWA staff. Don't let it go to waste! Share the importance of watershed protection with a friend or neighbor. Your simple act of sharing can inspire new members and strengthen our collective effort to safeguard our natural resources.

Nature-inspired Inventions – Play the Intuition Game

(continued from page 6)

How'd you do? Check your answers below:

	Invention		Inspired by
1	Sticky Tape	1	Gecko Toes
2	Faster Swimmers	2	Shark Skin
3	Anti-Glare Screens	3	Moth Eyes
4	Velcro	4	Burdock Seeds
5	Bullet Trains	5	Kingfisher Beaks
6	Self-Cleaning Surfaces	6	Lotus Leaves
7	Wind Turbines	7	Humpback Whale Fins
8	Building Ventilation	8	Termite Mounds
9	Water Harvesting	9	Namib Desert Beetle
10	Bird-safe Glass	10	Spider Webs

From inspiration to invention, here's how it happened:

1. **Gecko Toes and Sticky Tape**
   - **Inspiration:** Ever wonder how geckos stick to ceilings? It's all in their toes! They're covered in millions of microscopic hairs called setae. These tiny hairs create a powerful adhesive force that lets them easily stick and unstick their toes as needed.
   - **Invention:** Researchers copied the structure of gecko toes to create reusable surgical tape which can be applied and removed repeatedly without losing its sticky power.
2. **Shark Skin and Faster Swimmers**
   - **Inspiration:** Sharks are lightning-fast swimmers, not because of their muscles, but because of their skin. It's covered in tiny, tooth-like scales called dermal denticles. These scales create little watery whirlpools that cut down on drag and actually push the shark forward.
   - **Invention:** Mimicking the shark skin texture for high-performance swimsuits was so effective swimmers started breaking records. Fun fact: these suits are now banned from competition.
3. **Moth Eyes and Anti-Glare Screens**
   - **Inspiration:** Moth eyes have a natural superpower - they don't reflect light in the dark (unlike a dog's eyes at night). This is because their eyes are covered in a microscopic grid of bumps that completely eliminates reflection.
   - **Invention:** On a smartphone, this anti-glare design makes screens easier to read in direct sunlight. On solar panels, it helps the panel absorb more light, making them more efficient.
4. **Burdock Seeds and Velcro**
   - **Inspiration:** Swiss engineer, George de Mestral, was hiking when he noticed burdock seeds clinging to his pants. Closer inspection showed the seeds had tiny hooks which latched onto the fabric's loops.
   - **Invention:** Velcro is a fastener with thousands of tiny hooks and loops. It's used on everything from shoes to space suits. Fun fact: Velcro got its name from a combination of two French words: velours (velvet) and crochet (hook).
5. **Kingfisher Beaks and Bullet Trains**
   - **Inspiration:** The Japanese bullet train made a loud sonic boom when exiting tunnels. An engineer (and birdwatcher) noticed the kingfisher bird could dive into water without a splash because of its long, pointed beak which cuts down on drag.
   - **Invention:** The engineer redesigned the train's nose to a similar shape.

This eliminated the sonic boom, and, bonus, reduced air resistance, making the train 15% more energy efficient.

6. **Lotus Leaves and Self-Cleaning Surfaces**
   - **Inspiration:** The lotus leaf is nature's self-cleaning surface—it stays spotless even in filthy water. This is because microscopic bumps on the leaf force water to bead up. As the beads roll off, they pick up all the dirt. Fun fact: The lotus plant is a symbol of purity in many cultures.
   - **Invention:** The "lotus effect" has been copied to create self-cleaning paints, glass, fabrics, and more. These surfaces are stain-resistant and require less maintenance because rain (or a quick rinse) washes away the dirt.
7. **Humpback Whale Fins and Wind Turbines**
   - **Inspiration:** The large bumps (tubercles) on the front of a humpback whale's fins make them more aerodynamic by creating small, spinning whirlpools. This lets the whale make sharper turns for traveling and hunting.
   - **Invention:** This same design was applied to wind turbine blades. Blades with these bumps are more efficient and generate power at lower wind speeds than smooth blades.
8. **Termite Mounds and Building Ventilation**
   - **Inspiration:** African termites are amazing engineers! They build huge mounds that stay cool inside at a steady temperature, even when outside temperatures change drastically. They do this by building a complex network of tunnels and vents that keeps the air flowing constantly.
   - **Invention:** Architects in Zimbabwe mimicked this design to create The Eastgate Centre, a large office building with a natural ventilation system. The building uses 90% less energy for heating and cooling than a typical building of the same size.
9. **Namib Desert Beetle and Water Harvesting**
   - **Inspiration:** The Stenocara beetle lives in the Namib Desert, one of the driest places on the planet. To get a drink, it just collects the morning fog right on its bumpy shell. The shell's special pattern of bumps attracts the water, which then rolls down little grooves and funnels right to the beetle's mouth.
   - **Invention:** Researchers have copied the beetle's shell to create special films and surfaces. They believe this could be a great way to collect clean water from fog in dry areas.
10. **Spider Webs and Bird-Safe Glass**
    - **Inspiration:** Most spider webs are invisible to birds which doesn't always end well for the bird. However, some spiders weave UV-reflective silk into their webs, which is visible to birds but not to most insects. A better ending for birds - not so much for bugs.
    - **Invention:** Bird-safe glass with a special UV-reflective coating which creates a pattern that's visible to birds. This helps keep birds safe, yet it's transparent to the human eye.

We can all learn something by opening our eyes and our minds to the simple things all around us. Because as you can see, in nature, most designs are a matter of life and death, so they tend to get it right.

Support Through Planned Giving

(continued from page 14)

tax exemptions, along with charitable deductions, offer additional savings. For example, all taxpayers can deduct cash charitable gifts up to $1,000 for individuals or $2,000 for couples to qualified 501(c)(3) organizations, even if they don't itemize.

By planning your gift—through a will, life insurance policy, retirement account, or charitable trust—you can reduce your tax burden while leaving a lasting impact on your community and natural resources.

How to Get Started

If you are ready to take this step, here are a few ways to begin:

1. **Consult a Professional** – Your financial advisor can help you identify strategies to reduce estate taxes. An estate planning attorney can ensure that your will is legally sound and accurately reflects your wishes.
2. **Choose Your Beneficiaries** – Include family, friends, and organizations like GSWA that reflect your values.
3. **Designate Specific Gifts** – Consider leaving a percentage of your estate, a set amount, or even appreciated assets like stocks and real estate.
4. **Review Regularly** – Life changes, and your will should, too. Be sure to update it as circumstances evolve.

Other Tax-Smart Ways to Give

Planned Giving extends beyond Wills:

- **Donor-Advised Funds (DAFs):** These charitable accounts allow you to recommend grants to organizations like GSWA now and in the future—and even pass the account to your heirs. *October 9th is DAF Day, making it a perfect*

Leave a Legacy with GSWA

Protect clean water and open space for generations by including the Great Swamp Watershed Association (GSWA) in your estate plans. Your gift preserves land, safeguards water and inspires future environmental stewards.

Ways to leave your legacy:

- **Bequest in Your Will** – Name GSWA as a beneficiary of cash, a percentage of your estate, or assets such as stocks or property.
- **Donor-Advised Funds (DAFs)** – Recommend grants to GSWA now or later.
- **IRA Qualified Charitable Distribution (QCD)** – If you are 70½ or older, you can give up to $108,000 directly from your IRA, tax-free.
- **Life Insurance or Retirement Accounts** – Designate GSWA as a beneficiary for a lasting impact.
- **Charitable Trusts** – Receive tax and estate planning advantages, provide income for yourself, or loved ones, and support GSWA's mission at the same time.

Every gift—large or small—helps keep our waters clean and our lands protected.

For more information, contact Wade (wkirby@greatswamp.org) or Lynne (lapplebaum@greatswamp.org).

time to explore how DAFs can maximize your philanthropy.

- **Qualified Charitable Distributions (QCDs):** If you are age 70½ or older, you can donate tax-free directly from your IRA to GSWA. Instead of taking your required minimum distribution, you may direct up to $108,000 annually, reducing taxable income while making an immediate impact.

GSWA Advisory Council Member Adam Psichos of Glenmede Trust reminds us: *"Philanthropic tools like donor-advised funds and IRA charitable distributions align giving with financial goals, offering tax savings while supporting the causes you value most."*

Leaving a Legacy of Hope

Estate planning shapes the story your life tells. Including GSWA ensures that story not only reflects your values but actively protects clean water, conserves land and strengthens communities for generations to come.

For a private conversation about your own planned giving legacy, contact Wade Kirby, Director of Development, or Lynne Applebaum, Director of Institutional Relations, at (973) 538-3500.

Have You Considered Including GSWA in Your Estate Plans?

Designating the Great Swamp Watershed Association as a beneficiary in your will is a sure way to continue your support for our work and sustain it long into the future.

Specific language in your will should be reviewed with your attorney. For more information on GSWA's Planned Giving program, please contact Wade Kirby, Director of Development at (973) 538-3500 or *wkirby@greatswamp.org*.

From the Financial Corner

By Eric Fenchel, Director of Finance

Our fiscal year ended on June 30, 2025, with strong financial results. Our revenues were over $1.2 million, besting our budget and prior year. Our three major events (Gala, Native Plant Program and Music Event) were very successful and raised a combined $30,000 more in net revenue than the prior year. We had an operating surplus and strong gains in our investments resulting in positive cash flow and an increase to our Net Assets.

Forever Chemicals: New Research Maps PFAS Contamination Patterns Across New Jersey's Watersheds

(Continued from page 15)

Combined sewer systems, the underground pipes that transport both wastewater and stormwater, emerged as the leading contamination source in New Jersey. Combined sewers collect everything from household products to industrial discharge. When it rains, these aging systems can overflow, spreading PFAS-contaminated water into the environment. The Northeast region, with its dense network of decades-old combined sewers, showed the highest contamination levels.

Further analysis also revealed that urban areas have significantly higher PFAS levels than agricultural or undeveloped regions. However, even pristine-appearing undeveloped areas showed detectable PFAS levels, demonstrating these chemicals' ability to travel long distances through air and water.

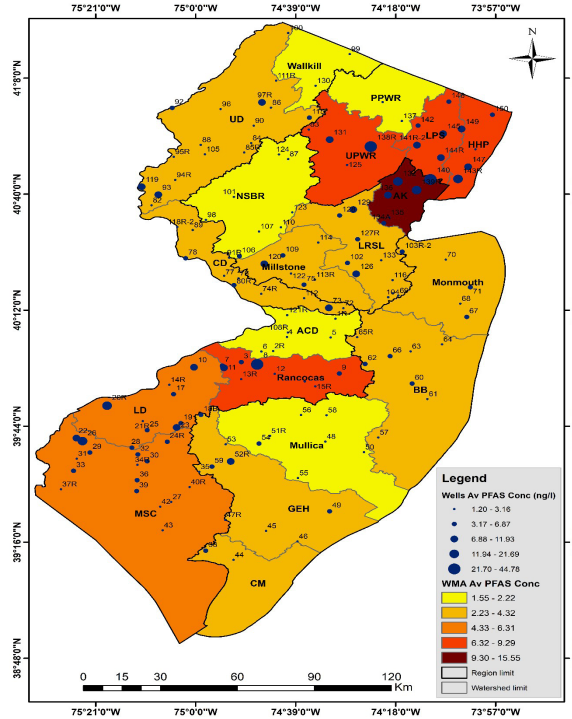

Fig. 1. *Geospatial visualization of PFAS across New Jersey monitoring wells, WMAs, and regions*

The research identified several factors that influence PFAS levels in any watershed:

- **Aquifer characteristics:** Shallow, unconfined aquifers are more vulnerable.
- **Land use patterns:** Urban and industrial areas show higher contamination.
- **Infrastructure age:** Older sewer systems correlate with higher PFAS levels.
- **Proximity to sources:** Wells within 1,876 meters of contamination sources showed significantly elevated levels.

Taking Action: What Communities Can Do

This research is not meant to alarm but to inform and empower action. Here is what individuals and communities can do:

- Regularly test your wells for PFAS.
- Consider installing certified water filters that specifically remove PFAS.
- Reduce PFAS exposure by avoiding non-stick cookware, checking product labels, and choosing PFAS-free personal care products and alternatives.
- Support local and state initiatives for infrastructure improvements.
- Continuous monitoring of public water supplies.
- Voluntarily participate in watershed protection programs.
- Immediate attention to the combined sewer infrastructure.
- Installation of smart contaminant detectors in homes.

- Targeted remediation in the most affected watersheds.

Looking Forward: From Research to Resilience

The scope of PFAS contamination revealed by this study demands coordinated action. The good news is that we now have detailed, watershed-specific information to guide targeted interventions. The research also highlights an important truth: watershed protection is community protection. The water flowing through the watershed connects us all, and contamination anywhere affects everyone downstream. By understanding PFAS sources and pathways, communities can work together to protect this vital resource.

New Jersey is one of the top states that is actively finding solutions to PFAS crises; these findings provide a roadmap for continued action. The path forward requires upgrading aging infrastructure, particularly combined sewer systems, implementing advanced treatment technologies, and maintaining vigilant monitoring and volunteering programs.

Most importantly, it requires informed and engaged communities. Every resident who tests their well, every municipality that upgrades its sewers, and every individual volunteering for clean water contribute to the solution. The "forever chemical" problem will not be solved overnight, but with comprehensive data and community action, we can protect our watersheds for future generations.

The views and conclusions expressed and drawn in this study are those of the authors and do not necessarily reflect the views, conclusions, or policies of USEPA, USGS, NJGWS, NJDEP, or the United States. For more information about PFAS testing and filtration options, visit EPA.gov/pfas or contact the New Jersey Department of Environmental Protection.

GSWA Experts Available to Speak to Area Groups

Do you wonder, "What is in my water?" or "What can I do to keep water clean for my children?" These and other questions about water quality, land preservation, and local efforts to protect the environment can be answered by the Great Swamp Watershed Association (GSWA). GSWA speakers give interesting, hands-on presentations that will educate and inspire members of your local club or group. Please call (973) 538-3500 or email *info@greatswamp.org.*

An Introduction to Light Pollution

(continued from page 1)

hidden by artificial light, like our 73-acre Conservation Management Area (CMA) in Harding Township, are closed from dusk to dawn.

How we measure light pollution

The brightness of the night sky is rated on the Bortle Scale, which ranges from 1-9 of darkness to light, respectively. A rating of 1-2 on the Bortle Scale means the Milky Way is fully visible and clear, with clouds dark and appearing as holes in the star-covered sky, while a rating of 8-9 is city sky, where stars are barely visible or invisible and the sky color is gray to orange. Newark, Paterson and of course New York City are all rated at 9, while even the most rural places in New Jersey like the Delaware Water Gap rates a 4.5, meaning the Milky Way is present but light pollution can still be seen along the horizon. At our Conservation Management Area in the heart of Morris County, the Bortle Scale is 6.7, so the Milky Way is faintly visible on only the clearest of nights and the clouds are bright from the surrounding light pollution.

The Bortle Scale is used to inform astronomers of the best locations for stargazing, rating how visible galaxies and constellations are on a clear night; however, areas with high ratings like cities can also affect human health. Studies have shown that excess exposure to artificial light can put one at increased risk of depression, type 2 diabetes (this link is primarily explained by the disruption of the body's natural circadian rhythm), and more. Natural darkness is critical for our bodies' much-needed time to recover from the day, but when streetlights bathe bedrooms in light it can be difficult to have restful sleep.

Humans are not the only ones impacted by artificial light. Nocturnal animals, the ones specially adapted to perform best in the dark, do not have the same upper hand on their prey when the hunting grounds are flooded in light. Moths, sea turtles and other wildlife use the moon to navigate, but with artificial lighting they see many smaller moons, leading to disorientation and sometimes death. Even plants need darkness – studies have shown that exposure to artificial light can cause deciduous trees to retain their leaves sometimes much later into the fall. Night-blooming plants, like evening primrose, are experiencing lower pollination rates since those moths and other pollinators can't find their way through the myriads of moons.

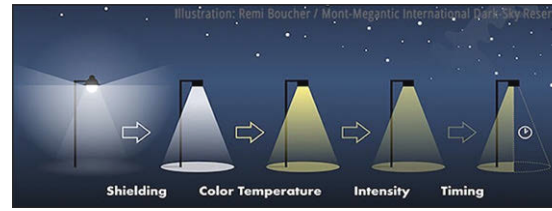

Figure 2. Night sky friendly lighting. Source: hillcountryalliance.org

Like most pollution, the problem is everywhere. But luckily, unlike unrestrained carbon emissions or the omni-present plastics littering our waterways, light pollution can be stopped by each of us flipping a switch. Limiting outdoor lighting, using motion sensors, and changing the light fixtures to aim towards the ground instead of the sky can help stop disrupting plants and nocturnal animals. In your home, use less lights when possible and switch to warm-toned lights can help your own body's circadian rhythm stay in tune. Each outdoor floodlight turned off, each light fixture changed, every blue-toned light swapped to amber color can all add up to not only a healthier ecosystem, but also a healthier lifestyle.

Put their money where your mouth is!

A group of GSWA supporters* has pledged to donate $90 to GSWA for every vegan meal served at the Gala.
This plant-based meal was thoughtfully crafted by vegan chef and wellness expert, Leslie Durso.

EVERY PLANT--BASED MEAL MAKES A DIFFERENCE.

SAVE WATER. Opting for the plant–based meal at the Gala saves 600 –1,000 gallons of water versus the steak option.

Producing one pound of beef requires 2,000 – 8,000 gallons of water, and one gallon of cow's milk requires 1,950 gallons.

PROMOTE CLEAN WATER. Animal feed and livestock agriculture accounts for over 50% of all freshwater pollution.

REDUCE EMISSIONS. Animal agriculture accounts for 14.5% of all human-caused greenhouse gas emissions, more than all transportation categories combined.

GOING VEGAN FOR THE GALA PROMOTES A HEALTHY ENVIRONMENT AND BENEFITS GSWA AT THE SAME TIME!

**The Vegan Challenge is proudly sponsored by Cold Brook Farm in Oldwick, Bernardsville Centre, and a group of anonymous donors.*

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