



CENTER FOR
**WATERSHED
PROTECTION**



ANNUAL REPORT 2021

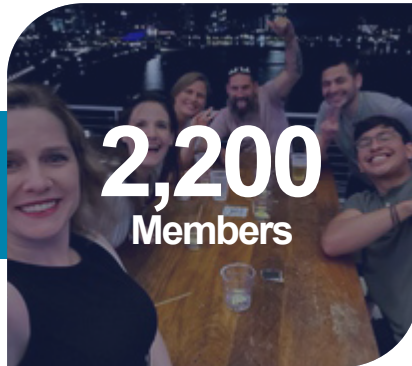
Mission & Impact

The Center for Watershed Protection, a 501(c)3 nonprofit organization, advances clean water resources and healthy ecosystems through responsible land and water management.



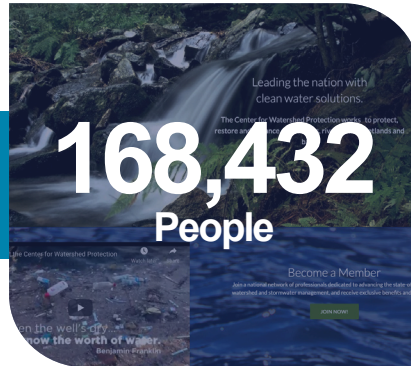
81
Successful
Completions

of the Center's Clean Water Certificate workforce development training program for green infrastructure construction, inspection and maintenance



2,200
Members

of the Center for Watershed Protection Association



168,432
People

informed through our newsletter, social media and website



24,000
Total Viewing Hours

during the 2021 National Watershed and Stormwater Conference and Webcast Series



6
Reports

research reports published



13
Watershed
Management Plans

for watersheds in Maryland, Pennsylvania, New York, Delaware, and the U.S. Virgin Islands



32
Groups

provided customized technical assistance on watershed or stormwater management

Dear Friends,

The challenges and uncertainty in 2021 lasted much longer than anybody expected (or hoped), but the Center for Watershed Protection emerged stronger and more prepared as an organization, continuing a hybrid model of communications internally and externally.

Maintaining and growing the Center's contributions to the science and practice of watershed-based management remained the focus this past year along with the ability to provide access to our work and services. The National Watershed Research Network was envisioned as the first-of-a-kind group working collectively to help communities achieve clean water and healthy watersheds by funding applied research on topics determined by its members to advance the practice of watershed protection and restoration.

During 2021, new partnerships began with Delaware Center for the Inland Bays; the Maryland State Fairgrounds; Wyoming Valley Sanitary District, Pennsylvania; Restore America's Estuaries; Philadelphia Water Department; and Trout Unlimited. This complemented our ongoing work with many others such as regional and local organizations, and grew by engagement with groups such as the New England Interstate Water Pollution Control Commission; the Interstate Commission on the Potomac River Basin; Groundwork USA; Audubon Naturalist Society, Department of Energy & Environment in the District of Columbia; Maryland Department of Natural Resources; Town of Bluffton, South Carolina; James River Association in Virginia; and EPA Chesapeake Bay Program.

In addition, funding from long-term partners such as the William Penn Foundation, Keith Campbell Foundation, National Fish & Wildlife Foundation, and Chesapeake Bay Trust continued to help us fund research and implementation projects.

We also finished our 2021-2025 Strategic Plan that reemphasizes our four program areas of Watershed and Stormwater Consulting Services, Training, Membership, and Research so we can build on these fundamentals in future years. In 2022, we forecast a resurgence of both federal and local sector work with growth in the Midwest and Pennsylvania.

The future continues to be bright for the Center. As we grow, we invite you all to engage with us in the coming year and to thank all who have continued to support this organization.



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Accomplishments: Research

Monitoring the Effect of Stormwater Retrofits on Downstream Hydrology and Channel Stability

For more than 10 years, stormwater engineers in Carroll County, Maryland have experimented with the retrofit of existing stormwater ponds originally designed to reduce the rate of runoff to receiving streams. Modeling results indicate that these retrofit designs—specifically, enhanced sand filter and



wet pond designs—capture and retain enough rainfall that peak flows from the two-year storm are less than those from a wooded site in good condition. Carroll County also observed that the highly eroded streambanks downstream of the retrofits stopped retreating and began to re-vegetate over months or years after the construction of the retrofits.

Carroll County Bureau of Resource Management and the Center for Watershed Protection partnered on a study to examine the influence of these stormwater retrofits on the hydrogeomorphic response of the receiving channels. Two pond retrofits in Carroll County were selected for analysis. Following a paired watershed design, a set of control and treatment watersheds were selected to generate hydrologic, hydraulic, and geomorphic data during the pre-treatment (1 year) and post-treatment (1-2 years) periods.



The study showed that the enhanced sand filter and wet pond retrofits performed as designed and reduced the magnitude, duration, and frequency of erosive flow rates, reducing the measured runoff curve numbers and simulating a hydrologic regime close to that of the “woods in good condition”

performance standard. The results for the channel stability portion of the study were more variable given the relatively short study timeframe. Anecdotal evidence from this study is illustrated in the photos above of one of the treatment sites before retrofit installation (top) and 13 months after installation (bottom). It is expected that, with the reduced hydraulics within the catchment, these banks will continue a trajectory toward stability as indicated by reduced bank angles and vegetation establishment. This study established baselines for the stream response that will be built upon by continued monitoring efforts by the Center and Carroll County which are planned for 2022. More time and continued monitoring will likely be needed to get data for a greater range of storm intensities and to allow bank stability to be fully achieved and measured.

Accomplishments: Research

Using a Novel Research Framework to Assess Water Quality Impacts of Urban Trees

Urban trees impact the hydrologic cycle by capturing runoff in the canopy, drawing water from the soil, and adding organic matter to the soil to increase infiltration. These processes collectively contribute to the ability of urban trees to reduce the amount of rainfall that contributes to stormwater runoff. Increasingly municipal stormwater programs allow site developers to earn stormwater management “credit” for preserving or planting trees on development sites. Modeling tools such as i-Tree Hydro and the Center’s urban tree credit calculators have helped to improve how we quantify the effects of urban trees on stormwater runoff. The Center was awarded a grant from the Chesapeake Bay Trust to further advance this research. The Center teamed with researchers at the University of Maryland and the University of British Columbia to 1) evaluate whether more complex urban forest types have a greater potential to reduce urban runoff and 2) evaluate how trees can be grouped into distinct “typologies” based on information such as tree height, species, and surrounding land cover.



“This research provides the foundation to better model and credit the benefits of urban trees.”



The runoff reduction potential of urban trees was evaluated by monitoring trees in different settings, ranging from individual trees to closed canopy for three years. Measurements of transpiration (sap flow), rainfall, and soil moisture were combined with soil infiltration models to quantify how much runoff resulted, and how each part of the hydrologic cycle was impacted in each setting. As a companion to this monitoring and modeling study, the University of British Columbia tested the potential for developing a tree typology in an urban setting using available LiDAR data from Montgomery County, MD. This research provides the foundation to better model and credit the benefits of urban trees in different settings, and to manage trees in the urban landscape using available GIS data. Ultimately, the goal is to provide tools to urban stormwater managers who need to devote resources to both preserve and enhance a large inventory of urban trees.

Accomplishments:

Watershed & Stormwater Services

Watershed Management Studies in the U.S. Virgin Islands

In 2019, the U.S. Virgin Islands Department of Planning and Natural Resources obtained grant funding from the Federal Emergency Management Authority to develop watershed management plans for three high priority watersheds on St. Thomas and five high priority watersheds on St. Croix. The goal of these watershed planning studies was to identify and evaluate watershed-specific issues and develop attainable solutions to improve water quality and reduce flooding. The Center for Watershed Protection, as part of a team with Watershed Consulting Associates, led the development of watershed characterization reports for each watershed, conducted a Watershed Planning Audit to assess local programs and regulations that address watershed protection to identify strengths and weaknesses, and estimated pollutant loads using the Center's Watershed Treatment Model.



Photo credit: Watershed Consulting

The watershed management plans will be used to inform local agencies and institutions regarding site-specific options for flood reduction, stormwater management, and water reuse. These plans are an opportunity to identify where and how to improve drainage issues that have arisen from land cover change over time and as a result of climate change.

Support for Water Quality Monitoring Standards in Lancaster County, PA

For the past three years, the Center has operated a Circuit Rider program to provide technical assistance to municipalities in Lancaster County, Pennsylvania on reducing stormwater pollution. Grant funding provided by the Keith Campbell Foundation supports a countywide collaboration of diverse partner organizations, including local business leaders, municipal public servants, higher education providers, conservation planners, and non-profit leaders, that come together to achieve a vision of clean and clear water in Lancaster County by 2040. This work has included technical support to the Lancaster Clean Water Partners. Center staff serve on the Partners' Steering Committee, and also provide leadership for the Water Quality Monitoring Action Team, which develops guidance, protocols, and procedures for water quality monitoring data collection, analysis, and reporting in support of target stream de-listing projects across Lancaster County. In 2021, the Center helped the Water Quality Management Action Team established protocols for the verification and use of data collected by volunteers to further inform de-listing initiatives and demonstrate progress toward the achievement of clean water goals. The Center's assistance to the Partnership also includes software development for uniform data uploads and efficient training methods to ensure compliance with quality assurance/quality control standards.

Accomplishments:

Watershed & Stormwater Services

Building Local Capacity for Low Impact Development in Washington, DC

The Center for Watershed Protection was hired by the District of Columbia Department of Energy and Environment to build capacity among Business Improvement District (BIDs) and Main Streets organizations to construct and maintain low impact development (LID). These organizations play a role in providing education and outreach to the businesses and residents of the neighborhoods within their respective areas. The Center conducted four trainings for the District's BIDs and Main Streets to increase the capacity for constructing and maintaining LID retrofits in the City. A site visit was conducted for each participating organization to determine potential locations of a LID retrofit project. Center staff developed 13 concept designs for LID projects and took one of the projects through complete design and permitting. The project construction will be complete in 2022. As a result of the Center's work, these community organizations are now well-versed in the impacts of stormwater and the benefits of LID and have the necessary resources to seek funding for and oversee the implementation of LID projects in their neighborhoods.



Assawoman Bay and Isle of Wight Bay Watershed Implementation Plan

The 2019 Maryland Coastal Bays Watershed Plan identifies the general suite of agricultural and urban best management practices (BMPs) needed to bring the five coastal bays into compliance with water quality standards. One of the plan recommendations is to conduct further targeting and field assessments to identify specific locations where future project installation is feasible. The Maryland Coastal Bays Program contracted with the Center to take this next important step towards implementation for the Assawoman Bay and Isle of Wight Bay/St. Martin River subwatersheds.

The Center gathered and reviewed data that could be used to help identify and/or prioritize locations to install BMPs, solicited stakeholder input on the types of BMPs to prioritize and the best locations for their installation, and used a geospatial targeting analysis to identify locations within the study watersheds with high opportunity for stream restoration, ditch restoration, stormwater retrofits, riparian buffers, and/or wetland restoration. Center staff evaluated priority sites in the field, resulting in the identification of 11 candidate BMPs. The Center developed concept designs for four of the top projects that will be used as the basis for future implementation funding requests. The parcel prioritization results will also be used by the Maryland Coastal Bays Program to guide future landowner outreach to secure support for additional high-priority restoration projects.



Accomplishments:

Watershed & Stormwater Services

Maryland State Fairgrounds Green Infrastructure Project

The Maryland State Fairgrounds, located in Baltimore County, hosts events year-round, including the Maryland State Fair which attracts over half a million people annually. The Fairgrounds has a long history of engaging the public in educational activities, particularly around agriculture. While the Fairgrounds is a hotspot for events and agricultural education, it is also a hotspot for stormwater. The Fairgrounds covers more than 100 acres and is predominantly covered by pavement or buildings. Due to the lack of green space and stormwater treatment infrastructure, rain events are increasingly causing both chronic and nuisance flooding. For example, during the 2018 Maryland State Fair, farm animals had to be rescued from the livestock tie-out area when a large rain event generated enough stormwater that some animals were at risk of drowning.

The Center received a grant from the National Fish and Wildlife Foundation to assess the Fairgrounds for feasible stormwater projects to address these concerns and improve water quality. The Center proposed and developed a complete design for a submerged gravel wetland.

Once implemented, this project will reduce nutrient and sediment pollution entering the nearby stream, while also mitigating severe erosion problems. The construction of the stormwater management practice which includes a Nature Play Space will provide a great opportunity to help visitors understand the purpose of stormwater management and provide a place for families to engage with nature. The Center obtained grant funding to construct this project, which will commence in 2022.



“This stormwater retrofit project, along with a planned nature play space, will be an excellent educational hub for the public to learn about stormwater management and reconnect with the natural landscape.”

– David V. Lykens, Director,
Baltimore County Department of
Environment and Sustainability

Accomplishments: Membership

On April 13th through April 16th, 2021, the Center for Watershed Protection hosted its sixth annual National Conference virtually. Our National Watershed & Stormwater Conferences are offered each Spring, and they provide a forum for sharing fresh ideas on the principles and practices of watershed and stormwater management. For the second year in a row, the conference was held virtually to keep our attendees, presenters, sponsors, and staff safe and healthy. With more than a year of experience working and communicating virtually under our belts, the Center was able to build in interactive and engaging networking opportunities just as we would for the Center's in-person events.

Nearly 200 people attended the virtual event, which featured engaging, informative, and innovative presentations and/or workshops from 70 speakers.

As a complement to the National Conference, the Center hosted the 2021 Sustainable Watersheds & Agriculture Symposium. This virtual symposium provided an opportunity for watershed and resource conservation professionals to discuss and learn about the role agriculture can play in improving watershed health and water quality. Over 50 attendees from across the United States joined us virtually for the 2021 Sustainable Watersheds & Agriculture Symposium.

Accomplishments: Training

The Center's ANSI-accredited Clean Water Certificate (CWC) training program helps to create a bridge for the stormwater industry with workforce development programs to fill a growing demand for jobs to install and maintain stormwater green infrastructure practices. In 2021 the Center adapted the CWC training program for instructors local to the city of New Orleans with funding from the Water Environment Federation and the Greater New Orleans Foundation. The Center delivered this pilot program in February 2021, where nine individuals successfully completed the program to become CWC Instructors. For New Orleans, CWC closed the gap in green infrastructure training for entry-level laborers and continues to increase opportunities for under or unemployed individuals in low-income communities to secure a living wage job.

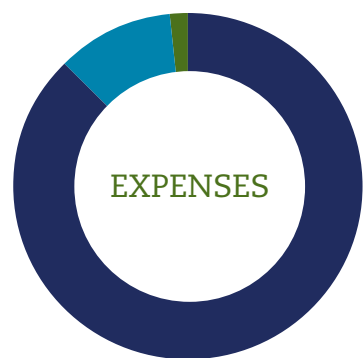
The Center's expansion of the CWC program through the training of CWC instructors across the U.S. adds substantial value to the program, including 1) effective training delivered by an instructor familiar with local terminology, regulations, and pertinent water issues, 2) growing partnerships with local workforce development organizations and potential employers, and 3) an increased number of industry experts reviewing the curriculum providing feedback for continued improvement. In June 2021, ten additional instructors completed the "Instructor Preparation Program." As a result of the CWC Instructor Preparation Program, over four times the number of ANSI-accredited certificates were issued in 2021 than in previous years.



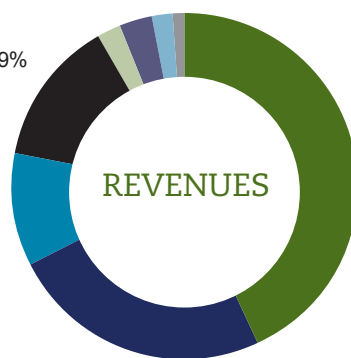
Photo credit: Thrive New Orleans

Thrive New Orleans celebrating the graduates of the Thrive Works Green program, a comprehensive 8-week stormwater management installation training program which seamlessly incorporated the Clean Water Certificate training program.

Financials



- Program Services: 87.6%
- Administrative & General: 10.9%
- Fundraising: 1.5%



- Local Gov't Contracts: 43.1%
- Federal Grants/ Contracts: 24.6%
- Non-Government Contracts: 10.6%
- Other Grants, Gifts, & Contributions: 13.4%
- Workshops: 2.4%
- Membership Dues: 3%
- Investment Income: 1.9%
- Conference Sponsorship: < 1%

Funders

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We also appreciate the hundreds of donors who made donations to the Center through their workplace giving and other campaigns. In 2021, the Center received \$623.89 from the United Way, \$127.23 from the Amazon Smile Foundation, \$31.00 from the Giant Community Bag Program, \$30.16 from Givinga Foundation, Inc., and \$536.08 from America's Best Charities.



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The Center is proud to have achieved the Better Business Bureau Wise Giving Alliance's Standards for Charity Accountability. In 2021, the Center met the Standards for Charitable Accountability set forth by the BBB's Wise Giving Alliance. Also, the Center is a platinum level participant in the GuideStar Exchange for nonprofit transparency.

