

ABSTRACTS

32ND ANNUAL NONPOINT SOURCE CONFERENCE

Woodstock, VT | April 27 & 28, 2022

Julianne Busa | *Fuss & O'Neill*

Taking it to the Streets: Mobilizing a Community Around Green Infrastructure Through Creative Planning and Outreach

Presented: 4/27/2022 | 10:30 AM

As precipitation events become more intense and less predictable, our undersized and aging stormwater infrastructure is expected to pose a greater threat of failure and flooding. Like many New England communities, Easthampton, MA recognizes a need for sound, future-focused solutions, and with this in mind, in 2020, partnered with Fuss & O'Neill through funding from the Massachusetts Municipal Vulnerability Preparedness (MVP) program to develop a City-wide Green Infrastructure Master Plan, a graphically-compelling public-facing document that identified priority opportunities to address stormwater-driven flooding hazards and improve water quality through the use of nature-based practices. Simultaneously, we developed detailed design plans for a Green Infrastructure pilot project on a residential street in one of the City's densely developed Environmental Justice neighborhoods. The project, which will be constructed in 2022, will leverage funds from a \$2 million MVP grant, as well as other federal funding to address ongoing climate hazards in the neighborhood, restore ecosystem impacts in the local conservation area, and serve as a green infrastructure demonstration site for the City—the first implementation site to showcase the range of possibilities depicted in the broader Green Infrastructure Master Plan.

In addition to being a first-of-its-kind project in the City, the project is also championing a new approach to outreach. City staff and Fuss & O'Neill developed a trio of on-site neighborhood workshops to engage residents who will be most affected by the project and directly incorporate their input into the design. This process has led to an exceptional degree of buy-in from residents and served to strengthen the relationship between City departments and the community. Collectively, these efforts are helping City decision-makers and residents think proactively about climate resilient development strategies and projects that will reduce flood risk, benefit water quality and ecological health, and provide community co-benefits through nature-based solutions.

Jim Pease | *State of Vermont*

Building Stormwater Public-Private Partnerships in Vermont

Presented: 4/27/2022 | 10:30 AM

The State of Vermont is embarking on the development of stormwater public-private partnerships to help incentivize and achieve part of the Lake Champlain TMDL phosphorus developed land reduction target. In public-private partnerships the town and a private entity often mutually both gain by reduced construction costs, compliance with permit requirements, or other factors including identifying with the goal of clean water. In one example In Shelburne, Vermont the Town and State are working with the Vermont Electric Company, a statewide utility, to access the utility's power line corridor to build a large treatment practice. An in-line 1.5 acre stormwater gravel wetland will treat a runoff from a 100 acre drainage and will be built in the fall of 2020. Significant phosphorus and sediment reductions are

expected to result. The pros and cons of the Shelburne project will be discussed as will other examples of both existing and proposed public-private partnerships.

Benjamin Sweeney | *New Hampshire Department of Environmental Services*

Exploring Alternative Funding Options for Stormwater Management and Flood Resilience in Dover, NH:
A Stakeholder-Driven Process and First Step in Building Community Support

Presented: 4/27/2022 | 10:30 AM

Recognizing a lack of funding is a major impediment to local progress on flood resilience and stormwater management, the NH Department of Environmental Services and the Piscataqua Region Estuaries Partnership partnered with the City of Dover to provide technical assistance as they evaluated alternative funding strategies capable of providing adequate, reliable funding for on-the-ground implementation projects. In November 2020, Dover City Council established an Ad Hoc Committee of residents, business representatives, developers, non-profits, and environmental advocates charged with exploring various funding options (e.g., stormwater utilities, system development charges, public-private partnerships, village districts, etc.) and providing recommendations on whether the City should pursue one or more of those funding options. Over a 14 month process the Committee met monthly to review current and future flood resilience and stormwater management funding needs while assessing alternative funding options against secure, adequate, flexible, and equitable (SAFE) criteria. This effort is the City's first step in securing dedicated funding that will address unavoidable increases in costs due aging and undersized infrastructure, worsening flood risk, and regulatory requirements.

Similar stakeholder-driven processes have proven to be an effective first step in building community and political support for alternative stormwater funding strategies in Portland, ME and Northampton, MA. Each Committee member underwent their own discovery process to identify their preferred funding option, which instilled a sense of ownership over the Committee's final recommendation for the City to consider developing a stormwater and flood resilience utility. Therefore, Committee members have become the best possible advocates for a utility and are poised to play a critical role in public education and outreach efforts if the City chooses to move forward. The Committee is currently finalizing their recommendations report in preparation for a presentation to City Council in January 2022, and hopes to begin developing and implementing an outreach plan immediately.

Emily Bird | *Vermont Department of Environmental Conservation*

Partnering to Measure Vermont's Agricultural Clean Water Progress

Presented: 4/27/2022 | 10:30 AM

Vermont is a small, rural state with a big commitment to water quality. Agriculture is one of the major contributors to water quality challenges in the state, but farmers are stepping up for water quality in a big way. This talk will share how state and federal agencies, as well as local partners, are working together to track, account, and communicate progress by the agricultural sector for clean water. Topics will cover coordination of agricultural conservation practice data tracking and verification and use of innovative tools, such as the Agricultural Partners Database, as well as lessons learned from 6+ years of practice that are transferrable to other states and land use sectors.

Marli Rupe | Vermont Department of Environmental Conservation

Accelerated Water Quality Improvement Through the NRCS Regional Conservation Partnership Program

Presented: 4/27/2022 | 10:30 AM

In 2015, the State of Vermont, in partnership with 25 organizations, agencies, businesses and non-profits, was awarded the second largest Regional Conservation Partnership Program (RCPP) grant in the US, totaling \$16 million. In 2019, the State was awarded an additional \$10 million to continue the project for another five years.

This project used creative collaborations and incentive programs and increased targeted technical assistance to accelerate the implementation of NRCS programs in the Lake Champlain watershed in Vermont and New York. Lake Champlain is an 8234 square mile watershed that experiences frequent algae blooms in many parts of the Lake, due to phosphorus levels above the levels necessary to meet the state and federal water quality standards. Lake Champlain is under a TMDL (Total Maximum Daily Load) plan that requires substantial phosphorus reductions with 67% of the reduction needing to come from agriculture.

Dairy farming is the primary agricultural activity in Vermont, and has been severely impacted by extended low milk prices. The number of dairies in Vermont has decreased 35% in the past decade and these financial struggles have increased the difficulty in implementing agricultural practices.

This RCPP grant looked at traditional agricultural and forestry BMPs, but also focused on natural resource opportunities such as wetland and agricultural easements that provide additional water quality protection as well as direct phosphorus reductions. This presentation will outline the creative and collaborative initiatives of this grant that resulted in a hugely successful program, and the unique opportunities being considered for the next five years.

Joanne Throwe | Throwe Environmental, LLC

Accessing funding for nutrient, sediment, and stormwater pollution prevention projects through the Long Island Futures Fund

Presented: 4/27/2022 | 10:30 AM

The National Fish and Wildlife Foundation's Long Island Sound Futures Fund supports projects to fully restore the health and living resources of Long Island Sound. It operates within a partnership of federal and state agencies, foundations, and others who are dedicated to restoring and protecting the Sound. There is an unprecedented \$10 million in current funding available, along with a much lower match requirement in 2022. The Long Island Futures Fund is currently seeking proposals to restore the Long Island Sound in the Upper Basin (CT, MA, VT, NH) with a focus on water quality projects. In this session, you will hear important details about program priorities, geographic boundaries, project examples, and tips for drafting a more competitive proposal.

Lauren Jenness | NEIWPCC/Lake Champlain Basin Program

Stream Wise Award Program Development in the Lake Champlain Basin

Presented: 4/27/2022 | 1:00 PM

The Stream Wise Award Program is a newly developed initiative to inform and incentivize rural and urban riparian private landowners in the Lake Champlain Basin to protect and plant native vegetated

buffers that can promote stream health and resiliency. The program was developed under a grant sponsored by the Lake Champlain Basin Program awarded to a project consulting team (Fluid State Consulting, Greenleaf Designs and The Image Farm) and in partnership with federal, state, and provincial partners who provided input on program development and approved all work products as well as with watershed organizations, conservation districts, and other water quality related groups who plan to implement the program in their local jurisdictions. Modeled after the Lake Wise Award Program in Vermont, Stream Wise programming is accomplished through outreach, site assessment, and provision of a Stream Wise Award or Certificate of Participation with targeted recommendations and technical assistance to help property owners achieve Award status. The Stream Wise Assessment Protocol is based on research conducted on riparian buffer programs, regulations, and guidelines for Vermont, New York, and Quebec. The presentation will provide an overview of the Stream Wise program development process and showcase all Stream Wise program material, including the Stream Wise Resource Library, Stream Wise Program Outline, Stream Wise Desktop and Field-based Assessment Protocols, Stream Wise Branding and Style Guide, Stream Wise Communications Plan and Social Media Kit, and Stream Wise website. 2022 will be the Stream Wise Award Program's pilot season.

Matthew Vaughan | NEIWPC/Lake Champlain Basin Program

The Past, Present, and Future of Lake Champlain: Using Long-term Monitoring Data to Determine Tributary Loads and Educate Stakeholders

Presented: 4/27/2022 | 1:00 PM

Determining the amount of water, nutrients, and sediment delivered each year by major tributaries is critical for effective management of large lake ecosystems and requires substantial investment. Further, analyzing and communicating results of these efforts for many different stakeholder groups is nontrivial. Lake Champlain is a treasured and significant natural resource situated between the US states of New York and Vermont, and the Canadian province of Quebec. This lake has suffered from several anthropogenic stressors, including excessive non-point source nutrient loading from developed lands and agricultural activities. As a result, Lake Champlain is the subject of several water quality restoration goals, including two Total Maximum Daily Load regulations for phosphorus. The Lake Champlain Long-term Monitoring Program (LTMP) has collected water quality and biological data in Lake Champlain and its tributaries since 1990 to detect environmental change and inform progress on these shared water quality goals. Here, I use LTMP data and a flow-normalization modeling technique to examine annual tributary concentrations, loads, and long-term trends for key water quality parameters: total phosphorus, dissolved phosphorus, total nitrogen, chloride, and total suspended solids. I also discuss best practices for communicating these results and associated uncertainty with policy makers, lake managers, and the lay public. This work lies at the intersection of natural resource management, optimized resource allocation, environmental monitoring, uncertainty, science communication, and environmental policy.

James Houle | UNH Stormwater Center

Clean Sweep: Expert Panel for Nonstructural Best Management Practices

Presented: 4/27/2022 | 2:00 PM

NEIWPC Panel

Latest tracking and accounting efforts in the region

1. Clean Sweep – Discuss process and outcomes related to leaf collection activities and nutrient reductions
2. Retention Standards – Discussion of the latest recommended standards to protect water quality related to on-site stormwater retention and updated performance curves for a wider range of soil types.
3. PTAP – BATT – presentation of integration of consistent tracking and accounting tools that can access and integrate evolving accounting standards in the region.

Joshua Faulkner | *University of Vermont Extension*

The Lake Champlain Basin Conservation Effects Assessment Project: Embarking on a Long-term Partnership for Intensive Watershed Monitoring and Research

Presented: 4/27/2022 | 2:00 PM

The University of Vermont is leading a long-term partnership with multiple state and federal agencies to intensively monitor water quality at the field- and watershed-scale in the Lake Champlain Basin. The goal of this project is to accurately assess the effects of agricultural conservation practices on non-point source pollution concentrations and loads. This is the newest initiative within the USDA-NRCS Conservation Effects Assessment Project (CEAP) nationwide network. In Vermont, a paired-watershed study design will be utilized, and implementation of conservation practices will be closely tracked in a control and treatment watershed, during both a calibration and a treatment period. Gaging stations and automated water quality monitoring stations have been established, and will be followed by similar monitoring infrastructure on fields nested within the treatment watershed. At the field-scale, performance of innovative conservation practices and ‘stacking’ of practices will be evaluated. Partnerships with the USDA-NRCS, USGS, Vermont Agency of Natural Resources, and the Vermont Agency of Agriculture are critical to the project’s implementation and success.

Kristen Underwood | *University of Vermont*

Functioning Floodplain Initiative for Improved Flood Resiliency, Restored Water Quality and Enhanced Habitat

Presented: 4/27/2022 | 2:00 PM

Connected and naturally-functioning floodplains have many associated values, including enhanced fish and wildlife habitats, water quality protection and improvement, avoided damage from floods and fluvial erosion, and storage of carbon affecting the earth’s climate. This presentation will review progress on a first phase of Vermont’s Functioning Floodplain Initiative to support floodplain restoration and protection in the Lake Champlain basin and better communicate the human and ecological benefits of these reconnection projects. Our interdisciplinary team has created mapping and decision-support products that: 1) identify opportunities for restored river and floodplain connectivity, 2) quantify the effectiveness of these interventions to improve river and floodplain connectivity and function, and 3) prioritize these projects by engaging stakeholders and the public. This work leverages a database of stream geomorphic assessment data for more than 2,300 miles of river, collected over the last 15 years. Future work will build a web-based tool to prioritize and visualize implemented reconnection projects and track progress towards implementing the Lake Champlain TMDL and naturalizing the river-floodplain interactions to reduce flood and erosion risks.

Craig Jewett | Otter Creek Engineering

Relocation and Reuse of Village Snow Dump

Presented: 4/27/2022 | 3:30 PM

The Village of Woodstock used an area lovingly called the Jungle, directly along the bank of the Ottauquechee River, to store and dispose of their winter snow. After Tropical Storm Irene, the Village was left with a significantly smaller area to utilize. The effects of this environmental disaster, along with the environmental impacts of the existing land use and reuse potential of the site, inspired Village staff and local residents to reimagine the area as a public park, which would also require relocation of the snow dump. The efforts from the Village, Woodstock Foundation, Two Rivers Ottauquechee Regional Commission, Sustainable Woodstock, Otter Creek Engineering (OCE) and many volunteers lead to a new, environmentally sensitive designed snow dump, as well as the only public park along the Ottauquechee River within the Village—with additional parking and a green stormwater infrastructure treatment system. A focus will be given to how both the snow dump design/relocation and conversion of the existing site were funded by several different funding programs and how the project partners coordinated with multiple organizations to see this project through to completion.

Sara Morrison | Fuss and O'Neill

The Pocasset River Plan: Hybrid Design Approaches for a Resilient Urban Watershed

Presented: 4/27/2022 | 3:30 PM

The Pocasset River is a 26-square mile urban watershed in Rhode Island located to the immediate south of Providence. The neighborhoods around this river are challenged with major flooding problems. The floodplain along this river has been largely developed with multi-family and single family residential development as well as industrial and commercial development. In addition, this watershed has been largely built out resulting in major flood risks in these low lying neighborhoods.

The USDA Natural Resources Conservation Service (NRCS) is leading and funding a project that combines retreat, restoration of historic floodplains and limited use of floodwalls and pump stations. NRCS is funding this \$50 million project through their PL-566 Watershed Program. The Pocasset River Plan takes a hybrid approach to achieving its project goals by:

- (1) Reducing Risk: Make the watershed resilient to the 1% annual flood probability
- (2) Connecting Communities: Creating open space and public amenities
- (3) Enhancing Habitat: Restoring the floodplain with healthy ecosystems

The design of the plan takes the approach of an overarching watershed scale and makes site-specific, precise recommendations about appropriate design interventions at the individual property scale. This presentation will review the different elements of this hybrid plan that combines nature-based with traditional gray flood control systems resulting in a resilient watershed and a resilient community.

Edward Tanner | *Town of Bristol*

Watershed Restoration at Bristol Golf Course

Presented: 4/27/2022 | 3:30 PM

The Town of Bristol is nearing completion of a project to restore freshwater wetlands and floodplain at the 26 acre municipally-owned Bristol Golf Course property. The golf course was created in the 1960's prior to Town ownership, and was not built or maintained as an environmentally sustainable course by today's standards. The goals of this project are to restore freshwater wetlands at the course and improve the water quality of two tributaries that flow into Narragansett Bay; increasing flood storage capacity of the wetlands; and enhancing freshwater wetland habitat. The project includes installation of stormwater BMP's, the restoration of several surface water impoundments, removal of historic fill adjacent to wetland areas, daylighting of piped streams, and the restoration planting of native vegetation as buffer areas between wetlands and playable portions of the golf course. The intent is to maintain this property as open space for public recreation and enjoyment, but with improved environmental conditions. To accomplish the goals and intent, the Town has designed a nine-hole public golf course with a smaller active recreation footprint than previously existed; and with a redesigned layout using less land area while still providing public access and desirable public outdoor recreational opportunities.

The Town developed project design plans and received wetland permits from the RIDEM. Overall restoration work was conducted in two phases. Phase I, which was completed in spring 2021, was financed with grant assistance from the USEPA's SNEP Watershed Grants program and from RIDEM's Section 319 water quality grant program. Phase II commenced in spring 2021, and substantially completed all permitted restoration activities with grant funding assistance from a R.I. Infrastructure Bank's Municipal Resilience Program. This project includes a robust public outreach and public engagement component with many committed community stakeholders. The collaboration and multi-functional benefits of this project will serve as a model for other communities with respect to the management of public recreation property while incorporating environmental education and stewardship.

Michael Clay | *University of Maine*

Considering the importance of community perspectives and values in watershed planning with agricultural landowners

Presented: 4/27/2022 | 3:30 PM

Working to develop partnerships with communities and stakeholders is a critical, though often overlooked, part of conservation-oriented projects. Failing to include the perspectives of community partners and stakeholders in the development of such projects can oftentimes mean that they do not attain their goals and/or can become a source of frustration, or confusion, between communities and decision makers or conservation staff. Because of this, it's important to develop projects that seek to partner with communities early on in their design. This provides opportunities to include community partners and their perspectives in developing conservation problems, solutions, and goals. A first step in accomplishing this is developing a better understanding of the communities that decision makers and conservation staff would seek to partner with. As such, this presentation reflects lessons learned as a part of a research effort to develop a clearer understanding of the farming community within the Meduxnekeag Watershed in Northern Maine. This project emerged from the agricultural community's lack of adoption of riparian buffer strips on their land—a BMP that conservation staff in the area had identified as important while preparing a watershed-based plan (WBP) as a part of seeking EPA 319

grant funds. We discuss the lack of adoption of riparian buffers as an exigency that calls for a need to better understand the perspectives and values of farmers in the area in order to determine why they had not adopted riparian buffer zones as a practice. We offer a discussion of our methodology for developing that understanding, share some of the central findings that emerged from this work, and reflect on how those findings both indicate a need for stronger partnerships with farmers in the area and also provide information that will be useful for building those partnerships.

Nicole Davis | *Save the Sound*

Community engagement and community science for environmental justice: Case study from the Mill River (of south-central Connecticut) Urban Waters Initiative

Presented: 4/27/2022 | 3:30 PM

Community engagement and community science for environmental justice: Case study from the Mill River (of south-central Connecticut) Urban Waters Initiative

Community engagement is crucial for addressing the water quality of waterways around urban areas, particularly in areas that experience environmental injustice. The Mill River Urban Waters Initiative aims to create and nurture new connections between environmental organizations and residents of neighborhoods of New Haven, CT, which has experienced environmental injustices for generations, in order to amplify community voice and leadership in environmental stewardship and justice, and provide opportunities for community based science and research along the Mill River of south-central Connecticut.

Funding was awarded through the Connecticut Department of Energy and Environmental Protection from a US Environmental Protection Agency grant. The award to local organizations was made through an innovative project proposal process designed to foster collaboration. The project proposal process is discussed in detail including local stakeholder engagement, a series of public steering committee meetings and collaborative tools. The collaboration-focused project proposal process brought together nearly 50 different community-based organizations, environmental groups, schools, government and municipal organizations to discuss project ideas and unify around themes of community science and community outreach, engagement, and leadership. Outcomes from the first six months of funded activity on the Mill River Urban Waters Initiative, including: recruitment of community leaders, how the PhotoVoice method will be used by participants, community science and how these initiatives will be used to inform the next steps will be discussed.

Swarna Muthukrishnan | *Clean Ocean Action*

Clean Ocean Action – Rally for the Waterways – a Collaborative, No-Blame Approach to Find, Fix, and Eliminate Sources of Pathogen Pollution in Coastal Watersheds

Presented: 4/27/2022 | 3:30 PM

Pathogens are the primary source of impairments to water quality of rivers, streams, wetlands, and estuaries, and adversely impact recreational uses and shellfish harvest for consumption use. More than fifty percent of assessed waterbodies in New Jersey suffer from pathogen impairments, resulting in beach closures and downgrades to shellfish harvesting acres. Nonpoint source (NPS) and stormwater runoff routinely cause serious exceedances of bacteria water quality standards and are exacerbated by climate change-driven precipitation events and flooding in the state. In 2016, Clean Ocean Action (COA), which is a broad-based coalition of 115 groups located in Long Branch, NJ, established the

Rally for the Navesink coalition to address the chronic pathogen pollution and resulting downgrade of shellfish harvesting areas of the Navesink River watershed. The Rally model is a strategic “no-blame” approach with a specific goal – to find, fix, and eliminate sources of pathogen pollution. This is a collaborative approach that brings together municipalities, communities, innovative canine scent tracking, and New Jersey Department of Environmental Protection (NJDEP) to monitor and track down sources of bacteria pollution in upstream locations in the watershed. Volunteer community scientists trained by COA helped to collect more than 3,000 samples under a weekly ambient monitoring program for over three years. These results helped to identify likely upstream pollution sources and enabled municipalities to implement targeted efforts to eliminate these sources. The Rally for the Navesink proved to be a successful model and is widely recognized by NJDEP and USEPA- Region II Citizen Science Program. COA has expanded the program into “Rally for Waterways” to include and restore other coastal watersheds from NPS pathogen pollution. In 2020, COA was awarded an NPS grant by NJDEP to establish Rally for Barnegat Bay to track down and eliminate human sanitary sources in the Toms River sub-watershed in NJ.

Kira Jacobs | U.S. EPA

How to Develop Innovative Partnerships and Find Funding: 3 Projects that Will Inspire You

Presented: 4/28/2022 | 8:30 AM

This presentation will describe how NPS professionals can identify opportunities, funding, and partners focused on drinking water protection. Drinking water partners are highly motivated to develop and implement projects to protect water quality. Using three projects as examples, this talk will give attendees concrete ideas for how to achieve success in other watersheds.

EPA launched the Healthy Watershed Grant Program in 2016, in partnership with the U.S. Endowment for Forestry and Communities and with additional funding from the USDA-NRCS. This presentation will provide an overview of one of the Healthy Watershed projects, the Sebago Clean Waters Initiative: Forests. Faucets. Forever. It’s an exciting partnership focused on developing a “Water Fund.”
<https://www.sebagocleanwaters.org/>

In 2018, the Highstead Foundation received \$350,000 in Healthy Watershed Grant funds to launch “Sebago Clean Waters.” The project entails working with numerous partners to protect and improve drinking water quality in Sebago Lake through land conservation. Partners include Portland Water District, Loon Echo Land Trust, Open Space Institute, The Nature Conservancy, Trust for Public Land, and others who will collaborate with private landowners, communities, and water users.

Sebago Clean Waters’ mission is to protect water quality, community well-being, a vibrant economy, and the health of fish and wildlife in the Sebago watershed through voluntary forestland conservation. These forests create, filter, and sustain this area’s exceptionally pure water supply. The project goals are:

- 1) to conserve an additional 35,000 acres of land in the Sebago watershed (to conserve 25% of the land area) in the next 15 years; and
- 2) to build a \$15M Water Fund from new funding sources to support this land conservation work.

The presentation will highlight two other projects which will inspire colleagues who want to learn about innovative funding and partnerships. The 2018 Farm Bill requires that 10% of the \$4 billion provided annually by USDA through its conservation funds be directed towards drinking water protection. The

following two projects are receiving funding in 2020 as part of the Farm Bill requirements to protect drinking water.

- The Merrimack Conservation Partnership (MCP) is a joint effort between two dozen organizations in Massachusetts and New Hampshire. It is focused on protecting and improving water quality in the Merrimack River watershed with partners representing many different priorities. EPA is working with NRCS to prioritize conservation funds in the watershed.
- In addition, Kira will describe a new partnership in Connecticut's Farm River watershed. The Farm River project is part of the NRCS/EPA National Water Quality Initiative's Source Water Protection Pilot Project. It is a joint effort between NRCS, EPA, CTDEEP, CT Department of Public Health, the South Central Regional Water Authority, and the CT Association of Conservation Districts.

Christopher Obropta | *Rutgers University*

Building Robust Community Partnerships through the Green Infrastructure Champions Program

Presented: 4/28/2022 | 8:30 AM

In urban communities, stormwater runoff causes localized flooding and creates water quality problems. When many of these older communities were built, stormwater management was not required, which resulted in stormwater runoff from most streets, parking lots, roads, and rooftops to be quickly conveyed to local waterways without any treatment. If localized flooding and improved health of local waterways is a goal to a better quality of life, these communities must be retrofitted with green stormwater infrastructure. To achieve this goal, local leadership is needed. Green Infrastructure Champions is an Extension program that was created to empower local stakeholders to play a dominant role in encouraging municipalities and other property owners to implement green stormwater infrastructure practices. They are provided with a series of training opportunities to increase their knowledge about stormwater issues and green stormwater infrastructure solutions. After participating in five workshops, these individuals are certified as Green Infrastructure Champions and become key players in implementing green infrastructure as a stormwater management approach in their community. Once certified, the Green Infrastructure Champion has access to technical support from the Rutgers Cooperative Extension (RCE) Water Resources Program staff. This presentation will share the results of the first three years of this the Green Infrastructure Champions Program linking the certified Champions to green infrastructure planning and implementation that they were directly responsible for initiating in their communities.

Last year the training was moved to a virtual format with 10 online synchronous lectures that are also recorded so people can view them later. Hands-on opportunities are provided to the attendees to participate in green infrastructure assessments and construction. The program has been very successful. Trainees have gone on to secure grants to develop green infrastructure plans for their communities and build demonstration projects. The RCE Water Resources Program staff have assisted certified GI Champions in designing and constructing rain garden parks, implementation of bioswales, and designing of permeable pavement systems. Many GI Champions are serving on their local environmental commission and green teams to advocate for green infrastructure in their communities and ensure developers are managing stormwater with green infrastructure.

Judy Rondeau | *MassDEP*

Changing Tides in the Approach to Social Marketing

Presented: 4/28/2022 | 8:30 AM

Although well-intentioned, traditional approaches to social marketing have been demonstrated to not have the intended effect. Research has shown that traditional social marketing approaches do not result in the widespread adoption of the recommended behavior. Traditional approaches lack a method to convert awareness of a problem to the adoption of behaviors to address that concern. One approach to social marketing, called Community-Based Social Marketing, addresses that challenge by encouraging participants to make a personal commitment to the target message or behavior.

In 2018, the Long Island Sound Study (LISS) conducted a Community-Based Social Marketing pilot project in the Niantic River watershed in coastal Connecticut. Partnering with The Nature Conservancy and the Niantic River Watershed Committee, LISS tested messages designed to encourage homeowners in neighborhoods along the Niantic River to reduce or eliminate the use of lawn fertilizer to reduce nitrogen inputs to the river and Long Island Sound. Based on positive results from the pilot study, the Niantic River Watershed Committee successfully expanded the Community-Based Social Marketing campaign in 2021.

Cassandra Davis | *NYS DEC*

Prioritizing Watersheds by Phosphorus Contributions with the Loading Estimator of Nutrient Sources (LENS) Tool

Presented: 4/28/2022 | 10:30 AM

To support the development of clean water plans, as required by the federal Clean Water Act 303(d) program, the New York State Department of Environmental Conservation (DEC) developed the Loading Estimator of Nutrient Sources (LENS) tool. DEC has prioritized clean water planning for fresh waterbodies experiencing negative impacts due to excessive phosphorus levels. The purpose of the LENS tool is to quickly evaluate the relative phosphorus contributions to waterbodies based on simple equations, using existing or limited data, in order to determine the relative benefit of a particular type of clean water plan, identify data gaps and potential planning actions, and to evaluate recovery potential based on the source and magnitude of phosphorus loads.

LENS is a Microsoft Excel based tool that is used in conjunction with ArcGIS to estimate phosphorus loads for land cover runoff, onsite-wastewater treatment systems (septic systems), and municipal wastewater facilities. It is a simple steady state model that uses average, assumed conditions and estimated average annual loads from nonpoint sources and point sources. All of the GIS shapefiles used to create the LENS output are publicly available through the NYS GIS Clearinghouse. DEC has used LENS as a screening tool to prioritize waterbodies for clean water plans and to guide management actions in watersheds where data is lacking to support more complex modeling efforts.

Val Schull | *New York State Water Resources Institute, Cornell University*

Application of Water Quality Indices in Assessing Status of New York Great Lakes Tributaries

Presented: 4/28/2022 | 10:30 AM

The New York Great Lakes Basins are an important water resources for the state. As such, it is important to not only be able to assess the water quality status of tributaries feeding into Lakes Erie and Ontario, but also be able to summarize and effectively communicate in an accessible manner. Water

quality indices (WQIs) provide a method for summarizing and communicating water quality status in a simple, scientifically-based manner. In this study, the Unweighted Multiplicative Water Quality Index (UMWQI) that integrates water quality criteria and thresholds set forth by the USEPA and state-level environmental agencies (IDEM, OEPA, MDEQ) was applied to seven New York Great Lakes Basin (two in the Lake Erie Basin and five in the Lake Ontario Basin) tributary gauge sites. Monthly average subindex values were calculated for total phosphorus (TP), soluble reactive phosphorus (SRP), total suspended solids (TSS), and water temperature (WT). Literature-based assessment of appropriateness of the subindex equations ensured the UMWQI was reflective of water quality status for the New York Great Lakes tributaries.

Kerrie Garvey | *Watershed Consulting Associates, LLC*

Forest Land Accounting Methodology to Estimate Sediment and Phosphorus Reductions

Presented: 4/28/2022 | 10:30 AM

Vermont is heavily forested with 75% forest cover (4.4 million acres) across the state, and due to the dominance of this land cover, forestlands account for 16% of phosphorus loading to Lake Champlain and 9.4% of loading to Lake Memphremagog. These areas will require an average reduction of 18.7% for the Lake Champlain Basin and 5% for the Lake Memphremagog Basin to meet phosphorus reduction Total Maximum Daily Load (TMDL) goals. However, assessing forestlands for proper installation of acceptable management practices (AMPs) associated with forest roads and logging activities and providing phosphorus reduction credit towards the TMDL is very challenging given the large area of forestlands, the distributed nature of forest roads, and the lack of a comprehensive dataset of forest roads and installed AMPs. The VT DEC also requires information regarding the effectiveness, design life, and performance of AMPs to credit phosphorus reductions. However, with no accounting system in place to estimate these pollutant reductions associated with forestland AMPs, targets are challenging to achieve or predict.

Watershed Consulting Associates, LLC in partnership with an interagency team of experts from the Department of Forests, Parks and Recreation (FPR), and the VT Department of Environmental Conservation (DEC), established a forestland BMP phosphorus and sediment accounting methodology focusing on forest roads and Use Value Appraisal parcels. The project included a thorough review of existing research, a survey of key experts, and advisory committee guidance. The methodology estimates phosphorus yield, hydrologic connectivity, and AMP reduction efficiency to calculate phosphorus reductions. Modeling data was generalized so the methodology can be easily utilized by forest stewards, is compatible with data collection standards, and meets the needs of the VT DEC's phosphorus tracking program. To generalize the model, more than 44,000 model runs were completed using a variety of unique combinations of input variables.

Nate Pacheco | *VHB*

Introducing the New England Stormwater Retrofit Manual

Presented: 4/28/2022 | 10:30 AM

During this presentation we will introduce the New England Stormwater Retrofit Manual which was developed by the University of New Hampshire Stormwater Center and VHB with financial support from the Southeast New England Program (SNEP) Network and technical support of other SNEP Network partners, state agencies, and EPA Region 1. The manual provides guidance on how to approach the management of stormwater through installation of Stormwater Control Measures (SCMs) in existing or

reconstructed development situations (retrofits) where regulatory requirements do not dictate prescribed SCMs. The manual is meant to be used as supplemental guidance and a resource to support smart choices in site design as it relates to the mitigation of stormwater impacts from existing developed areas.

In retrofit scenarios, it is often challenging to determine the SCM best suited for the site. The manual is based on the concept that incorporating some stormwater treatment for developed sites is better than omitting all together because prescribed design standards cannot be fully met. The manual guides users to develop SCMs based on their core functional and treatment components and encourages the user to piece components together in configurations that best fit project and site-specific needs. The range of sites and scales where this guidance can be applied varies from watershed scale planning to the design of small-scale measures inserted into reconstruction projects.

The manual presents the US EPA (Environmental Protection Agency) SCM Performance Curves as a tool to quantify water quality benefit (i.e. pollutant removal credit) for a range of sizes and types of SCMs to aid in the selection process and justify the retrofit.

During this presentation we will give an overview of the manual, highlight the new way of approaching stormwater for the retrofit scenarios, and weave in real-life examples of how these approaches are being successfully implemented.

Robert Wildey | VHB

Using in-stream biological indicators to guide BMP deployment in mountainous watersheds

Presented: 4/28/2022 | 10:30 AM

Ski resorts and other development activities in mountainous watersheds can result in excess sediment loading to high-quality streams in the upper reaches of the watershed. These landscapes are generally not conducive to applying the standard suite of structural BMPs to treat runoff due to the extensive clearing and grading required to construct them in steep terrain. At a ski resort in northern New England, VHB worked with the landowner to identify locations where distributed, smaller-scale practices and non-structural BMPs could be employed to improve in-stream water quality. Annual monitoring of the aquatic biota was used to evaluate the success of this effort and identify locations where additional measures were required. Attainment of in-stream water quality standards was documented through this iterative process.

Emily Bird | Vermont Department of Environmental Conservation

Building Vermont's Clean Water Service Provider Network to Reduce Nonpoint Source Pollution

Presented: 4/28/2022 | 12:00 PM

Vermont's Clean Water Service Delivery Act restructured how Vermont administers clean water funding to build watershed/local-level capacity to meet and sustain non-regulatory/nonpoint source phosphorus reduction targets necessary to restore Lake Champlain and Lake Memphremagog. The Act established robust and long-term Clean Water Fund sources (approximately \$20 million/year) and established a formula-based grant program to allocate funds to newly established watershed-based Clean Water Service Providers. Formula funds are allocated based on non-regulatory phosphorus reduction targets--tied to Tactical Basin Plans and Total Maximum Daily Loads--and a standard cost per unit phosphorus reduced. Clean Water Service Providers will award funds to local project implementers under the direction of a Basin Water Quality Council made up of local, regional, and statewide stakeholder

organizations. Funds will support the full clean water project lifespan from identification through operation and maintenance. This presentation will orient the audience to Vermont's landmark legislation that will completely revamp how clean water funding is delivered on the ground. The establishment of the Clean Water Service Provider network is as much a technical as social exercise, engaging and building capacity of numerous stakeholders.
