

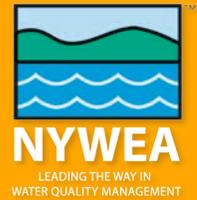


**Water Quality Issues in the NYC Watershed and Beyond**

# **NYC Watershed Science and Technical Conference**

**September 13, 2017**

**Diamond Mills Hotel, Saugerties, NY**



# We look forward to seeing you at the conference!

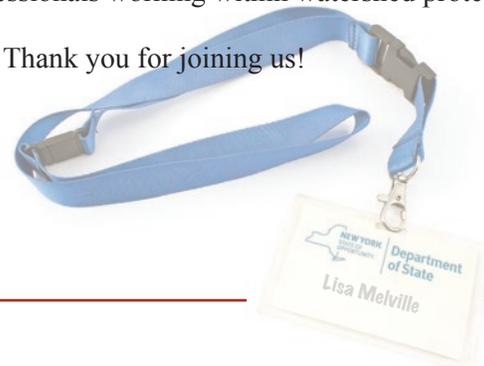
The Watershed Science and Technical Conference was created as an annual opportunity to bring scientists, professionals, and other experts together with watershed stakeholders and the public, to technically inform, exchange ideas, and unveil new information regarding the protection of the nation's largest unfiltered surface water supply.

In 1997, the signatories to the historic New York City Watershed Agreement formed an enduring partnership to protect and enhance the City's Watershed and the scores of communities living within it. Twenty years later, there has been unparalleled efforts and resources devoted to sound science and innovation in both human health and environmental disciplines within the New York City Watershed. This year's theme, "Water Quality Issues in the NYC Watershed

and Beyond," highlights the types of scientific research that was intended in the NYC Watershed Agreement.

The 2017 NYC Science and Technical Conference continues its long history of bringing this science to you. As conference attendees you will find yourselves in a unique forum for collaboration and technology transfer and to increase coordination among the array of entities and professionals working within watershed protection science.

Thank you for joining us!



## Organizers



**The New York Water Environment Association, Inc. (NYWEA)** – Founded in 1929, by professionals in the field of water quality as a non-profit, educational organization. Association members helped lead the way toward existing state and national clean water programs. Today the Association has over 2,500 members representing diverse backgrounds and specialties, but all are concerned and involved with protecting and enhancing our precious water resources. [www.nywea.org](http://www.nywea.org)



**The New York City DEP** – DEP is a New York City agency of nearly 6,000 employees that manages and conserves the City's water supply; distributes more than one billion gallons of clean drinking water each day to nine million New Yorkers and collects wastewater through a vast underground network of pipes, regulators, and pumping stations; and treats the 1.3 billion gallons of wastewater that New Yorkers produce each day in a way that protects the quality of New York Harbor. [www.nyc.gov/html/dep](http://www.nyc.gov/html/dep)



**The Watershed Protection and Partnership Council** – Created by the historic New York City Watershed Memorandum of Agreement to provide a regional forum to aid in the longterm protection of New York City's drinking water, and the economic vitality of the Upstate Watershed communities. <http://www.dos.ny.gov/watershed/>



**New York State Department of State** – The Office of the Secretary of State was established in 1778, making it, other than the Offices of Governor and Lieutenant Governor, the oldest agency in the administration of New York State government. [www.dos.ny.gov](http://www.dos.ny.gov)

## Many Thanks to the Conference Sponsors

- Catskill Watershed Corporation
- New York City Department of Environmental Protection
- New York State Department of Environmental Conservation
- New York State Department of Health
- New York State Department of State
- New York Water Environment Association, Inc. Lower Hudson Chapter
- United States Geological Survey
- Watershed Protection and Partnership Council

## “Water Quality Issues in the NYC Watershed and Beyond”

### 2017 NYC Watershed Science and Technical Conference

Wednesday, September 13, 2017

8:00 am  
8:30 am  
8:40 am  
8:45 am  
9:00 am  
9:10 am

Registration  
Welcome, Paul McGarvey, NYWEA President  
Welcome, Lisa Melville, NYS, Department of State  
Rossana Rosado, NYS Secretary of State (*Invited*)  
Paul Rush, Deputy Commissioner for Water Supply, NYCDEP



Paul McGarvey  
NYWEA President



Lisa Melville  
NYS DOS



Rossana Rosado  
NYS Secretary  
of State

Chitra Gowda, Source Water Protection Lead, Conservation Ontario  
Join Opening Panel speaker, Chitra Gowda, of Conservation Ontario, to walk through over a decade of successes and challenges of one of Canada’s flagship programs supporting public health in Ontario. The Clean Water Act, 2006, is part of the multi-barrier approach of the Government of Ontario to ensure clean, safe and sustainable drinking water for Ontarians, by protecting sources of drinking water including lakes, rivers and well water. Under this legislation, the drinking water source protection program



Paul Rush  
Deputy Commissioner  
for Water Supply,  
NYCDEP



Chitra Gowda  
Source Water  
Protection Lead,  
Conservation Ontario

was established with funding from the Government of Ontario. This resulted in the development of science-based assessment reports and local source protection plans by multi-stakeholder source protection committees, who are supported by Ontario’s 36 conservation authorities, the Severn Sound Environmental Association, and the Municipality of Northern Bruce Peninsula. Conservation authorities operate on a watershed basis, bringing together stakeholders across various political boundaries to contribute to the health of rivers, lakes and groundwater, thus supporting public health. Some of the highlights of Ontario’s program that protects the quality and quantity of sources of municipal drinking water are: collaborative approach involving multiple stakeholders, risk management plans containing measures to mitigate risks to municipal drinking water sources, municipal official plan updates and new land use planning policies, new standard operating procedures for the review and approval of permits and approvals by provincial ministries, installation of road signs that identify drinking water protection zones across Ontario, mandatory maintenance inspections of septic systems in certain areas, road salt management, and addressing activities on the landscape that could contribute to water quality issues such as nitrate in municipal wells and surface water intakes.

10:00 am–10:30 am

Break

**MORNING**

#### **SESSION I**

Contact Hours: 2.0 PE

10:30 am

#### **Application of Microbial Source Tracking Using *Bacteroides spp.* in a Watershed Stream: The N5 Case Study, Part II**

Kerri Alderisio, Kurt Gabel, David Alderisio, NYC DEP

The NYC Department of Environmental Protection (NYC DEP) routinely monitors the watershed for indicator organisms. Microbial Source Tracking (MST) is a way to help identify sources of microbes. At one particular stream, MST testing led to the repeated identification of molecular markers that are normally associated with humans rather than animals, which is extremely rare in the watershed. This presentation will review the field and laboratory results pertaining to the source(s) of the molecular markers.

11:00 am

#### **Time Scale Evaluation for the Detection of Trends in Protozoan Occurrence within the New York City Watershed**

Christian Pace, Kerri Alderisio, NYC DEP

New York City Department of Environmental Protection has an impressively large protozoan dataset, however, analysis of trends in long term data can be complex. Data from streams, upstate reservoir outflows, and source waters will be grouped in varying time scale scenarios to determine potential trends. Grouping scenarios and smoothing methods will be compared and environmental and analytical factors which may influence the trends will be discussed.

11:30 am

#### **Advancements in Phytoplankton Methodologies at NYC DEP**

Dr. Lorraine Janus, Karen E.B. Moore, David Van Valkenburg, Richard Van Dreason, Radan Homolac, Kirsten Askildsen, Donna Reynolds, Karen Collins, Jeremy Louey, Carolyn Swenson, John Kaurich, NYC DEP

Phytoplankton species composition and biomass are important to know in management of water supplies in order to control undesirable water quality. DEP is developing the capability to quantify phytoplankton species

composition and biomass using a method that can give better information than the current methodology. Results will be used to evaluate trophic changes, develop predictive models, and understand the role of algae in disinfection by-product formation potential.

12:00 pm

### **Suspicious Algal Bloom Monitoring in the New York City Water Supply**

Richard VanDreanon, Lori Emery, NYC DEP

Based on U.S. Environmental Protection Agency recommendations, the New York City Department of Environmental Protection initiated a monitoring program in 2015 to determine the occurrence of cyanotoxins: anatoxin-a, cylindrospermopsin, nodularin and six variants of microcystin in the water supply. In this presentation we will provide more details of the monitoring plan, discuss results through 2016 and discuss future plans to improve our monitoring capabilities.

12:30 pm–1:30 pm

Lunch

**MORNING**

## **SESSION II**

Contact Hours: 2.0 PE 0.5 Wastewater<sup>+</sup>

10:30 am

### **Years of On-site Wastewater Treatment Programs in the New York City Watershed – Lessons Learned and Status Update<sup>+</sup>**

Michael Meyer, NYC DEP

For more than 20 years, DEP has worked cooperatively with a number of watershed partners including Catskill Watershed Corporation, NYS Environmental Facilities Corporation, counties, municipalities, and private entities to develop and implement a number of programs that reduce the potential water quality impacts associated with improperly treated wastewater in the upstate water supply watershed. Collectively, these programs have resulted in nearly 9,000 on-site wastewater treatment systems (OWTS) that have either been repaired, rehabilitated, or connected to a centralized wastewater treatment system.

11:00 am

### **Long-term Water Quality Evaluation for New York City Reservoir Inflows**

Karen Moore, Jim Mayfield, NYC DEP

Historical water quality monitoring data provide the foundation to investigate linkages between nutrient fluxes and watershed management. Long-term data sets on river nutrient concentrations are essential for evaluating patterns and changes in system status and behavior. We applied the “Weighted Regressions on Discharge, Time, and Season” (WRTDS) approach developed by Hirsch and De Cicco (2015) to understand the changes in nutrient inputs to the main river inflows to New York City’s upstate water supply reservoirs.

11:30 am

### **Development and Testing of a Turbidity Model for Neversink Reservoir**

Rakesh Gelda, NYC DEP

A two-dimensional, multi-particle size class, dynamic turbidity model for Neversink Reservoir based on the transport framework of CE-QUAL-W2 is developed and tested for 1987-2015. The model performed satisfactorily in simulating turbidity in the reservoir and in the withdrawal. The model may be integrated into NYC DEP’s Operations Support Tool (OST) in the future.

12:00 pm

### **Correlation of Traditional Water Quality Parameters with Metal Concentrations in Permeable Pavement Infiltrate**

Jiayu Liu, Oakridge Institute for Science and Education; Michael Borst and Thomas O’Connor, USEPA

EPA constructed a 4,000-m<sup>2</sup> parking lot surfaced with three permeable pavements at the Edison Environmental Center in Edison, N.J., in 2009. Infiltrate samples from each permeable pavement were analyzed for 22 metals along with traditional water quality parameters [pH, chloride (Cl), total organic carbon (TOC), and suspended solid concentration (SSC)] from January 2010 to October 2015. Regression models show different correlation strength between metal concentrations in permeable pavement infiltrate with water quality parameters.

12:30 pm–1:30 pm

Lunch

**MORNING**

## **SESSION III**

Contact Hours: 2.0 PE

10:30 am

### **Per- and Poly-Fluoroalkyl Substances (PFAS): An Overview**

Elizabeth Denly, Michael Eberle, TRC Solutions

PFAS are a diverse group of man-made chemicals that are resistant to heat, water and oil. Their persistence and ability to transport are becoming an increasing area of concern. PFAS are ubiquitous, which presents a sampling challenge and an important consideration in source attribution. This presentation will provide an overview on PFAS: history and sources; regulatory status; chemistry of PFAS, basic definitions and physical/chemical properties; health effects and toxicity; and, sampling and analytical challenge.

11:00 am	<p><b>Fingerprint Evaluation of PFAS Source, Identification of Surface Partitioning, and Associated Remedial Implications</b>  Michael Eberle, Michael Edelman, Elizabeth Denly, Kenneth Quinn, TRC Solutions  The site involves PFAS impact to a drinking water supply reservoir. Based on Aqueous Film-Forming Foam (AFFF) usage near the site and known releases, five potential source areas were identified. PFAS fingerprints were generated for each area and used to identify the source of PFAS impacts. The presentation will also discuss the partitioning of PFAS from very dilute concentrations in stagnant water bodies into a thin layer on the surface.</p>
11:30 am	<p><b>Upscaling the Application of SWAT-HS to Simulate Hydrology for the Cannonsville Watershed, New York</b>  Linh Hoang, Rajith Mukundan, Karen E.B. Moore, Emmet M. Owens. NYC DEP  Based on the success of first test of SWAT-Hillslope (SWAT-HS) in a small headwater watershed (Town Brook) using a simple setup, we scale the model application up to the larger Cannonsville watershed with a more complex setup. Model evaluation is mainly carried out for streamflow and the spatial distribution of saturated areas, which provides a basis for water quality modeling and watershed program evaluation.</p>
12:00 pm	<p><b>What Can We Learn from the Visualization of Automated High Frequency Reservoir Monitoring?</b>  David Van Valkenburg, NYCDEP  Automated High Frequency Monitoring (AHFM) of NYC Department of Environmental Protection (DEP) reservoirs can provide multiple profiles of various water quality constituents over the course of a single day. To create these profiles, a combination of traditional and newer optical sensors are being utilized on some of the West of Hudson reservoirs. Data visualization was performed using the statistical package R to examine various reservoir features and compare laboratory analyses to <i>in-situ</i> sensor measurements</p>
12:30 pm–1:30 pm	Lunch
<b>AFTERNOON</b>	<p><b>SESSION IV</b>  Contact Hours: 2.5 PE 0.5 Wastewater<sup>†</sup></p>
1:30 pm	<p><b>Feasibility of Remote Sensing for Comprehensive Assessment of Trophic Status of Lakes: Case Study in New York</b>  Kirk Barrett, James Curra, Manhattan College  This presentation will assess the feasibility of using remote sensing for continual, routine assessment of trophic status of lakes, using Secchi disk depth (SD) for ground validation. Correlation between spectral data and the ground measurements via a published equation was poor for most lakes, with 75 percent showing R<sup>2</sup> values of less than 0.28.</p>
2:00 pm	<p><b>Making Sense of Optical Water Quality Sensor Data: Correcting for Interferences</b>  Emily Kinne, Paul Brown, Karen E.B. Moore, NYC DEP; Bruce Hargreaves, Lehigh University  Advances in optical sensor technology have made high-frequency monitoring of dissolved organic matter and other water quality constituents possible. NYCDEP is using submersible fluorometers on reservoir and stream sites to characterize dissolved organic matter and reservoir algae. An important step in interpreting sensor data is to evaluate sensor performance and account for the effects of interferences such as turbidity. This presentation will focus on how to evaluate and correct for interferences that affect sensor data.</p>
2:30 pm	Break
3:00 pm	<p><b>A Model of the Internal Seiche in Schoharie Reservoir</b>  Emmet M. Owens, NYC DEP  A model for the internal seiche in a stratified lake or reservoir is presented. This model uses the same description of reservoir bathymetry that is used by the CE-QUAL-W2 water quality model. This model is applied to Schoharie Reservoir. The model predicts the period of internal seiche oscillation, and the associated pattern of displacement along the length of the reservoir.</p>
3:30 pm	<p><b>Evolution of Cooperative Policy Development on New York’s Esopus Creek: The Ashokan Release Working Group</b>  William Richardson, NYC DEP; Amanda LaValle, Ulster County DEF; Kenneth Kosinski, NYSDEC; Mary McNamara, Esopus Creek Conservancy, Hudson River Watershed Alliance  This presentation will discuss evolution of the Ashokan Release Working Group, development of its mission for advocating sound reservoir release policies amongst competing objectives, and stakeholder views from multiple perspectives such as water supply, regulatory process, flood protection, ecological and recreational considerations. Current and future efforts including peer review during EIS development, modification of the “Interim Release Protocol” will highlight the collaborative consensus building process identified in the group’s mission statement and progress to date.</p>

4:00 pm	<p><b>Bayonne, N.J., CSO Treatment Demonstration Project – Disinfection Results<sup>+</sup></b>  Jurek Patoczka, Mott McDonald  The Bayonne, New Jersey CSO demonstration project included TSS pretreatment units followed by disinfection with peracetic acid (PAA) or UV lamps. PAA effectiveness was a function of the dose applied as normalized by COD. 3-log deactivation by UV required 25 mJ/cm<sup>2</sup> for low-pressure lamps and 40 mJ/cm<sup>2</sup> for medium-pressure lamps</p>
<b>AFTERNOON</b>	<p><b>SESSION V</b>  Contact Hours: 2.5 PE</p>
1:30 pm	<p><b>Potential for Wetland Creation through Small Dam Removal or Modification</b>  Maria Tupper-Goebel, Laurie Machung, Brielle Gurr, NYC DEP  DEP is developing a screening protocol to evaluate and prioritize city lands with existing ponds created by small dams for the potential to create wetlands through their removal or modification. Once selected, sites may be restored through third party mitigation or other partnership programs. Replacing open water habitat with vegetated wetland will help offset the historic loss of vegetated wetlands and their functions.</p>
2:00 pm	<p><b>Water Quality Protection and the Flood Hazard Mitigation Efforts in the New York City West of Hudson Watershed</b>  Phillip Eskeli, NYC DEP  The New York City-funded flood hazard mitigation program is documenting the anticipated water quality benefits of mitigation actions through the Local Flood Analysis process. Projects will be evaluated for their water quality benefits resulting in a better understanding of the City’s investment in water quality protection. The flood related water quality threats addressed by mitigation actions will be described using examples from communities involved in the program.</p>
2:30 pm	Break
3:00 pm	<p><b>Flow Histories of the Major Tributaries to New York City Water Supply Reservoirs in the West of Hudson Watersheds</b>  Jim Mayfield, NYC DEP  This presentation will examine flow histories for the main tributaries to the New York City water supply reservoirs in the West of Hudson watersheds using new data exploratory tools and statistical analyses developed by the United States Geological Survey (USGS). Discharge statistics will be determined for USGS streamflow gages located on the main tributaries of these reservoirs. Observed trends in the statistics will be discussed in context with the reported changes in meteorological conditions.</p>
3:30 pm	<p><b>Diversity of Programs in Land Acquisition</b>  David Tobias, Ira Stern, NYC DEP  This presentation will review New York City’s numerous watershed protection programs with respect to acquisition of land and conservation easements, and will also discuss how New York City manages those properties and natural resources once acquired. Specific attention will be paid to water quality considerations at the front end – i.e., how properties are selected – as well as on the back end – i.e., how properties and natural resources are managed.</p>
4:00 pm	<p><b>Using Reference Wetlands to Improve the Outcome of Wetland Establishment and Restoration Projects</b>  Laurie Machung, Frank Parisio, Maria Tupper-Goebel, NYC DEP  DEP has monitored 20 reference wetlands comprising 117 acres throughout the Catskill and Delaware Watersheds for over a decade. Plant species composition, soil characteristics, and water table dynamics were summarized for hardwood, hemlock hardwood, scrub-shrub, and emergent wetland types. This information has guided DEP’s design, construction, adaptive management, and assessment of wetland construction projects. Long-term wetland monitoring has provided a valuable benchmark of the conditions of wetlands in the New York City Watershed.</p>

**AFTERNOON**

**SESSION VI**

Contact Hours: 2.5 PE

1:30 pm

**Impact of Forest Harvesting on Streamflow in Neversink Reservoir Streams**

Kyongho Son, Elliot Schneiderman, Emmet M. Owens, NYC DEP;  
Laurence Lin, University of North Carolina

This study used remotely sensed vegetation indices to detect the forest harvesting areas and forest leaf recovery patterns in the Shelter Creek watershed. A paired watershed approach (control vs harvested) and a process-based modeling approach (using RHESSys) were utilized to investigate streamflow changes following forest harvesting and subsequent recovery.

2:00 pm

**A Framework for Vulnerability-Based Climate Change Impact Assessment for New York City Watersheds**

Rajith Mukundan, Rakesh Gelda, Emmet M. Owens, NYC DEP

The NYC DEP Climate Change Integrated Modeling Project (CCIMP) is exploring climate impacts on water resources. Phase II of CCIMP is using “bottom-up” or vulnerability-based methods to explore climate impacts on water resources with a focus on extreme hydrologic events. A framework for bottom up-based climate change impact analysis for New York City watersheds will be presented.

2:30 pm

Break

3:00 pm–4:30 pm

**Climate Resilience Discussion**

**Drinking Water Quality and Source Water Protection**

Lloyd Wilson, New York State Department of Health

There are approximately 9,000 public water systems in New York State. The Bureau of Water Supply Protection (BWSP) implements Safe Drinking Water Act regulations by providing guidance and technical resources to County and State District office staff who directly oversee the water systems. In recent years drinking water quality has become of heightened concern given the lead contamination at Flint, Michigan; the Toledo, Ohio contamination with harmful algal bloom toxin; and the West Virginia spill of 4-methylcyclohexanemethanol. In New York, the experience with the unregulated perfluorinated compounds (PFCs) at various locations including Hoosick Falls, harmful algal bloom toxin in Owasco Lake, and other unregulated compounds like 1,4-dioxane tested under the U.S. Environmental Protection Agencies (EPA) unregulated contaminant monitoring rule (UCMR 3) all have raised concerns about drinking water quality. Efforts to strengthen the drinking water program to address these concerns will be discussed.

**Traditional Source Water Protection Enhanced by Water Conservation (WaterSense) and Improvements in Water System Resiliency**

Andrew Kricun, Camden County Municipal Utilities Authority

Camden County (N.J.) Municipal Utilities Authority has implemented an aggressive green infrastructure program to address flooding and overflows in its CSO host community, and has taken measures to increase treatment effectiveness and efficiency and resiliency in moving toward a goal of net zero energy use by 2020. Engaging numerous stakeholders and community partners, collaborative efforts have multiplied the effectiveness of this approach, while improving the quality of life in the host city.

**Confronting Climate Issues in New York State**

Mark Wysocki, NYS Climatologist, Cornell University

New York State covers a wide range in topographical, coastal features and climate zones. Current trends in precipitation across New York State indicate a decrease in annual snowfall and an increase in extreme rainfall events ( $\geq 1.0$ "") since the 1950s. Specific trends by climate region will be presented along with the challenges for decision makers during a changing climate.



**Diamond Mills Hotel**

**25 South Partition St., Saugerties, NY 12477 (Ph: 845-247-0700)**

Room rates: \$210 Queen; \$220 King

The Village of Saugerties is nestled between the base of the Catskill Mountains and the verdant banks of the mighty Hudson River. One of the “Coolest Small Towns in America,” headquarters to HITS Horse Shows and having recently celebrated its 200th year as a Village, Saugerties boasts a bustling Main Street with antique stores, quaint cafés, restaurants and boutique shops that offer unique

clothing, accessories and gifts. A short stroll south on Partition Street takes you to the newest addition to this vintage village, Diamond Mills Hotel & Tavern.



# 2017 NYC Watershed Science and Technical Conference Registration Form

On-line Registration: <http://tinyurl.com/WatReg17>

September 13, 2017 • Diamond Mills Hotel, Saugerties, NY

## Instructions

Complete all portions of this form. Print or type information.

Name \_\_\_\_\_

Title \_\_\_\_\_

Employer \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Phone \_\_\_\_\_

E-mail \_\_\_\_\_

Check here if you are a speaker\*.

Speaker registration fee is waived.

## Payment

Cash  Check  Voucher Received by \_\_\_\_\_

Credit Card:  Visa  MC  AMEX

Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_ V-code \_\_\_\_\_

Signature \_\_\_\_\_

*Make all checks payable to NYWEA*

525 Plum Street, Suite 102, Syracuse, NY 13204

Please complete all vouchers before submitting for payment.

Registration form can also be faxed to: 315-422-3851,  
or emailed to mah@nywea.org.

Complete and mail or fax to NYWEA

Complete and mail or fax to NYWEA

NYC Watershed Science and Technical Conference	Registration Costs			Enter Fees
	Student	Member	Non-Member**	
One Day – Wednesday, September 13, 2017	\$30	PRE-REGISTRATION \$185	PRE-REGISTRATION \$265	
		ON-SITE (after 9/1/2017) \$220	ON-SITE (after 9/1/2017) \$300	
Exhibit Booth Fee (1 registration, additional \$50) Exhibit Hours: 9 am-4 pm		\$350		
			<b>Total Registration</b>	<b>\$</b>

One Day (Wednesday): Includes Continental breakfast and lunch.

\*Speakers: Registration includes lunch.

\*\* Non-Member registration includes an Affiliate Membership.



Registrations received after September 1, 2017 will be charged an additional \$35 site-registration fee.

Cancellations must be submitted in writing by September 1, 2017. A 20% service fee will apply to all cancellations received before September 1, 2017; no refunds will be made on registration fees or special events after September 1, 2017.