



**ENVIRONMENTAL &  
WATER RESOURCES  
INSTITUTE**



# CHLORIDES: IMPACTS ON URBAN LAND AND WATERWAYS

Recent studies have shown substantial increases in chloride concentration within cold weather climate watersheds due to the seasonal application of winter de-icing agents (namely roadway salts). Elevated chloride concentrations in stormwater runoff can have detrimental impacts to urban land and waterways including:

- Adverse effects on in-stream water quality and aquatic organism health
- Increased corrosivity and negative impacts on physical infrastructure
- Increased plant and tree mortality rates within green stormwater systems
- Adverse effects on soil geophysical properties and infiltration rates

Many communities and individuals are now considering the negative impacts of salt application and chlorides on urban land and waterways and are starting to implement progressive best management practices to address this issue. Join us for a morning seminar on roadway salt impacts on soil, vegetation, and water quality and learn of what is being done on a local, regional and national level.

National and Regional Expert Speakers Include:

**Robert Hirsch** – US Geological Survey (Washington DC Office)

**James Houle** – University of New Hampshire

**Dan Bain** – University of Pittsburgh

**Brady Porter** – Duquesne University, 3 Rivers QUEST

**Erin Kepple Adams** – Southwestern PA Commission

**WHO SHOULD ATTEND:** Water Quality/Environmental Professionals & Students, Civil/Water Resource Engineers, Green Infrastructure Professionals, Landscape Architects, Municipal & Government Officials, Watershed & Environmental Advocacy Groups

**COST:** \$25 Members, \$30 Non-Members, \$10 Students, \$15 Government and Non-Profit Employees (Register by Email)

**MONDAY  
FEBRUARY 26<sup>TH</sup>**

**REGISTRATION:  
7:30 AM**

**PRESENTATIONS:  
8:00 AM – 12:00 PM**

**ENGINEERS'  
SOCIETY OF  
WESTERN  
PENNSYLVANIA  
337 FOURTH AVE.  
PITTSBURGH, PA 15222**

**BREAKFAST  
INCLUDED**

**3.0 PDH  
CERTIFICATE UPON  
ATTENDANCE**

For further information  
contact:  
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REGISTER AT  
[www.asce-pgh.org](http://www.asce-pgh.org)



# AGENDA:

7:30 – 8:15 8:15 Sharp	<b>Registration and Breakfast</b> (Half hour presentations followed by 15 Minute Q&A) <b>A national perspective on long-term river chloride trends in snow dominated regions of the US and statistical methods used to evaluate these trends</b>
8:15 – 9:00	- Robert Hirsch, Research Hydrologist, United States Geological Survey
9:00 – 9:45	<b>Seasonal chloride levels on the Allegheny, Monongahela and Ohio Rivers Systems and their impact on aquatic biodiversity</b>
9:45 – 10:00	- Brady Porter, Associate Professor, Duquesne University and 3 Rivers QUEST
10:00 – 10:45	<b>Scheduled Break</b> <b>Hold the salt: Chloride toxicity in urbanizing watersheds and BMP cold climate performance</b>
10:45 – 11:30	- James Houle, Program Director, The University of New Hampshire Stormwater Center, Department of Civil and Environmental Engineering
11:30 – 11:45	<b>Road salt, legacy contamination, and green infrastructure: Preliminary observations from Pittsburgh</b>
11:45 – 12:00	- Dan Bain, Assistant Professor, University of Pittsburgh Department of Geology and Environmental Sciences
	<b>Pittsburgh regional salt management workshops update</b>
	- Erin Kepple Adams, Water Resource Manager, Southwestern Pennsylvania Commission
	<b>Closing Remarks and Adjourn</b>

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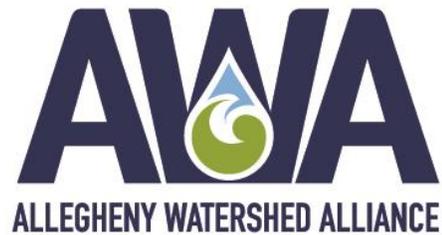
Civil & Environmental Consultants, Inc.



# WORKSHOP PARTNERS:



Allegheny  
Monongahela  
Ohio



WATER RESOURCE  
CENTER



## Robert Hirsch – US Geological Survey

Robert M. Hirsch is a Research Hydrologist with the U.S. Geological Survey (USGS) located at the USGS headquarters in Reston, Virginia. From 1994 through 2008, he served as the Chief Hydrologist of the USGS. In this capacity, Dr. Hirsch was responsible for all USGS water science programs. These programs encompass research and monitoring of the nation's ground water and surface water resources including issues of water quantity as well as quality. Hirsch earned a B.A. in Geology from Earlham College, an M.S. in Geology from the University of Washington, and a Ph.D. from the Johns Hopkins University Department of Geography and Environmental Engineering. He began his USGS career in 1976 as a hydrologist and has conducted research on water supply, water quality, pollutant transport, and flood frequency analysis. He is co-author of the textbook "Statistical Methods in Water Resources." Since returning to a research position in 2008, he has focused his efforts on describing long-term changes in streamflow and river water quality. This includes exploring century-scale trends in flooding nationwide. It also includes the development and applications of



new methods for characterizing trends in river water quality in many regions of the US and he has published applications of these methods to issues including nutrients, chloride, and mercury. This research has provided important insights on causes of the observed trends and has also resulted in the development of software (the EGRET R-Package "Exploration and Graphics for RivEr Trends") to help scientists analyze long-term water quality and quantity records.

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## Brady Porter – Duquesne University, 3 Rivers QUEST

Brady A. Porter is an Associate Professor of Biological Sciences and Adjunct Faculty of the Center for Environmental Research and Education at Duquesne University. He teaches introductory courses in General Biology and advanced courses in Vertebrate Anatomy, Ornithology and Stream Field Biology. His research focuses on conservation biology of aquatic organisms including population genetics of imperiled species. Dr. Porter received his B.A. in Zoology from Ohio Wesleyan University and his Ph.D. in Zoology from The Ohio State University before conducting postdoctoral research at the University of Georgia in the Department of Genetics and the Institute of Ecology. Shortly after arriving in Pittsburgh, he worked with the PA-DEP to pioneer the application of the Missouri benthic trawl to Pittsburgh rivers and his lab assisted the 2007 to 2009 Environmental Monitoring and Assessment Program- Great Rivers Assessment team to survey sites along the Allegheny River. He served as the research coordinator for the Murphy's Bottom Ecological Project to develop a master plan for reclamation of a former sand and gravel extraction site along the Allegheny River with the goal to maximize biodiversity.



He was a member of an international team appointed by the American Fisheries Society to update the listing of North America's imperiled freshwater and anadromous fishes and currently serves as a member of Pennsylvania's Fish Technical Committee. Dr. Porter oversees the monthly monitoring and analysis of Allegheny River sites as part of the Three Rivers QUEST program; an extensive network of academic partners and watershed groups that obtain baseline water chemistry data throughout the upper Ohio River System.

## James Houle – University of New Hampshire

James Houle is the Program Director for the Stormwater Center. His responsibilities include directing and managing the Stormwater Center's growing body of research projects. Areas of expertise include diffusion of innovative stormwater management solutions, the design and implementation of innovative stormwater control measures including green infrastructure (GI), and low impact development (LID) strategies, planning and implementation, operation and maintenance, and water resource monitoring.

Dr. Houle holds a Ph.D in Natural Resources and Environmental Science and has over fifteen years of experience with water quality related issues in New



England and is a certified professional in storm water quality (CPSWQ) and a certified professional in erosion and sediment control (CPESC).

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## Dan Bain – University of Pittsburgh

Daniel J. Bain is an Assistant Professor of Geology and Environmental Science at the University of Pittsburgh. He received his BA in geography and chemistry from Macalester College and earned his PhD in the Department of Geography and Environmental Engineering at Johns Hopkins University with a focus on fluvial geomorphology, trace metal geochemistry, and historic land use change. He studied non-traditional stable isotope geochemistry and catchment geochemistry as a National Research Council Postdoctoral Fellow at the US Geological Survey. Since joining the faculty at the University of Pittsburgh he has built a wide-ranging research program focusing on urban systems (e.g., green infrastructure and stream



restoration), energy production landscapes (long wall coal mining, unconventional gas extraction), and the role of trace metals in human and environmental systems.

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## Erin Kepple Adams – SWPA Commission

Erin Kepple Adams is the Water Resource Manager for SPC's Water Resource Center. She possesses 16 years of professional experience managing diverse pollution prevention and watershed management initiatives in more than 5 states.

Since 2013, Erin has focused the WRC's education and collaborative efforts on assisting the region's 10 county planning departments and 548 municipalities with the MS4 program, Act 167 Stormwater Management Planning efforts, and the National Flood Insurance Program (NFIP). In 2016, Erin developed educational materials such as the *Quick Resource Guide for Winter Maintenance BMPs* and the *Quick Resource Guide to the MS4 program*.

NH Department of Environmental Services' first Salt Reduction Coordinator in 2009 and 2010. She worked with NH DOT and municipalities to incorporate winter BMPs for more effective and efficient use of chlorides in the I-93 corridor without compromising public safety.

She assisted with the development and evaluation of the GreenSnowPro training curriculum for private sector road



and parking lot maintainers while serving on the I-93 Salt Reduction Steering Committee and I-93 Salt Reduction Workgroups.

Erin has a proven track record of thinking outside of the box, identifying problems, finding solutions and inspiring collaborative efforts. She holds degrees from Clarion University and Penn State University in Environmental Biology and Wildlife Technology.