Watershed 102

Aquatic ecology as it relates to stream and watershed restoration and protection

September 24-25, 2019, 9:00a-4:00p at Stroud Water Research Center

Workshop presented by Stroud Water Research Center: Matt Ehrhart - Scope and Scale Melinda Daniels, PhD – Fluvial Geomorphology Marc Peipoch, PhD - Chemistry Diana Oviedo-Vargas, PhD - Chemistry Jinjun Kan, PhD - Microbiology John Jackson, PhD – Macroinvertebrates and Fish David Bressler - Facilitator

and the state of the



Stroud Center

 Started in 1967 by the Stroud Family, Ruth Patrick, and Robin Vannote, see <u>https://stroudcenter.org/history</u>





Dick and Joan Stroud, original landowners and founders



Ruth Patrick, conceived of the Stroud Center and worked with Strouds to build it. Algae and all things freshwater; over 200 published papers; lived to 105 yrs old



Robin Vannote, Stroud Center's first Director

Vannote, R.L., G.W. Minshall, K.W. Cummins, J.R. Sedell, and C.E. Cushing. 1980. **The river continuum concept**. Can. J. Fish. Aquat. Sci. 37:130-137



Bern Sweeney, former Exec Dir

Recently retired, started Education and Restoration departments, Distinguished Research Scientist, >40yrs at Stroud





• Located along the East Branch of White Clay Creek



Stroud Center

FRESHWATER RESEARCH

ENVIRONMENTAL EDUCATION

THE ROBIN L. VANNOTE WATERSHED RESTORATION PROGRAM

Background

- Delaware River Watershed Initiative William Penn Foundation
 - Stroud Center helping to build science capacity through the basin







Background

- Citizen Science efforts among groups throughout the Delaware Basin
- Stroud Center directly involved in three clusters
 - Working in others





Stroud Center DRWI workshops

- Watershed 102 is one of the Stroud Center workshops via DRWI
- Others
 - EnviroDIY Mayfly sensor stations
 - Intro to EnviroDIY
 - Management
 - Trainings on maintenance and quality control
 - Model My Watershed
 - Monitor My Watershed
 - Macroinvertebrate ID
 - Watershed 101 workshop
 - Watershed 201 workshops



56 individuals registered

Organization
AT water research
Audubon Pennsylvania
Chester County Open Space Preservation
Darby Creek Valley Association
Delaware Valley Regional Planning Commission
Eastern Delaware County Stormwater Collaborative
French and Pickering Creeks Conservation Trust
Gillian's Run Citizen Committee
Great Marsh Institute
Kennett Township
ehigh County Conservation District
ower Merion Conservancy
Vilford Township Board of Supervisors
National Park Service- First State National Historical Park
National Parks Conservation Assoc.
Natural Lands Trust
Newtown Township
Penn State Master Watershed Stewards
Penn State University
Pike Co Cons District
Primrose Creek Watershed Association
Somerset Lake
Stroud Center
Susquehanna County Conservation District
The Nature Conservancy
The Watershed Institute
Two Roads Consulting
Jnaffiliated
Jniversity of Maryland Environmental Finance Center
JS EPA
Wilma Quinla preserve committee member



What is your title/role in the organization?		
Biologist	new graduate of 2019 MWS program	
Board Chairman	Owner	
Board Member on Education and WQ monitoring	PAC member	
Commitee person	Participant	
Communications Coordinator	Physical Scientist	
Conservation Specialist	Preserve Manager	
Consultant - Education Research & Evaluation	Preserve Manager	
Coordinator	President	
Director	Program Director for Water Resources	
Educator	PS MWS	
Executive Director	Ramsey Run advocate	
Executive Director	Senior Planner	
Fund II Apprentice	Senior Program Manager for PA & DE	
Graduate Student	Steward	
Land Stewardship Coordinator	Steward/Trainee	
Mamber	Stewardship Coordinator	
Master watershed steward	stream steward	
Master Watershed Steward	The Watershed Institute	
Master Watershed Steward	Township Supervisor/ Chairman Ag Sec Comm	
Master Watershed Steward	volunteer	
Master Watershed Steward	volunteer	
member	volunteer	
Member	Volunteer	
Member	water quality monitor	
member	watershed restoration manager	
MWS	Watershed Specialist	
MWS Steward	Watershed Specialist	
	Watershed Steward	



Are you a professional or volunteer?

55 responses







Did you attend a Watershed 101 workshop in 2017/18?

55 responses





What do you hope to learn in this workshop?

55 responses

• Some examples:

- Information I can share with the public re: water quality challenges and opportunities.
- More detailed information on aquatic ecosystems and ways we can help to correct issues.
- Evaluation of a stream health. Scientific and practical solutions for water quality issues.
- How best to control erosion in our streams
- Info to teach other people how to protect are water starting from a spring in the woods to the ocean. And educating people on storm water runoff from farms to industry.
- Case studies what works and what does not multi year management techniques for restoration
- Information on stream ecology that is new to me, and ways of sharing that information that
 I can convey to the municipalities and other partners with which DVRPC works.
- We have recently started to have flooding issues in my community. I would like to learn what factors are causing this and what if anything can be done to minimize them.
- Water chemistry and stream microbiology to assist in my water testing activities.



Dietary restrictions for lunch?

52 responses







<u>Day 1</u>

- 8:45-9:15 Welcome, refreshments, light breakfast
- 9:15-9:30 Introduction and overview for the day David Bressler
- 9:30-10:15 Scope and Scale Matt Ehrhart
- 10:15-10:30 Break
- 10:30-12:00 Hydrology, Fluvial Geomorphology Melinda Daniels, PhD
 - o Introduction and Natural Conditions
 - o Urban and Agricultural Impacts
 - o Effects and Efficacy of Remediation and Protection, Case Studies and Data
 - *Format repeats for the rest of the abiotic and biotic topics
- 12:00-1:00 Lunch
- 1:00-2:45 Water Chemistry Nutrients (Nitrogen and Phosphorus) Marc Peipoch, PhD
- 2:45-3:00-Break
- 3:00-4:00 Questions and Discussion

<u>Day 2</u>

- 8:45-9:15 Welcome, refreshments, light breakfast
- 9:15-9:30 Introduction and overview for the day
- 9:30-11:00 Water Chemistry Toxics and Emerging Contaminants Diana Oviedo-Vargas, PhD
- 11:00-11:15 Break
- 11:15-12:15 Microbiology Jinjun Kan, PhD
- 12:15-1:00 Lunch
- 1:00-3:00 Macroinvertebrates and Fish John Jackson, PhD
- 3:00-3:15-Break
- 3:15-4:00 Questions and Discussion



WS102 format

- Each presenter will:
 - Introduce the topic area
 - Physical hydrology, fluvial geomorphology
 - Chemistry nutrients, toxics and emerging contaminants
 - Biology microbiology, macroinvertebrates, fish
 - Describe what regional natural baseline conditions should look like
 - Contrast with what conditions look like in urban and agricultural settings
 - Review restoration and protection of these systems, case studies and data



WS102 format

- What's happening out there how are different landscapes affecting water?
- How do streams get degraded? Once it happens, what can be done?
- Where does protection fit? How can degradation be prevented?



Natural, less developed, more forested, riparian buffers



Natural, less developed, more forested, riparian buffers





Urban, developed, less vegetation, impervious surfaces









Urban, developed, less vegetation, impervious surfaces





Agriculture, less developed, animals/crops, nutrients, and sediment



Agriculture, less developed, animals/crops, nutrients, and sediment





Natural versus Ag - Turbidity





Natural versus Urban – Flow



*Water depth used here as a coarse surrogate for discharge (flow)



Natural versus Urban - Conductivity



The details





Final housekeeping

- Bathrooms and Stroud facility
- Lodging and travel reimbursements
 - See Rebecca Duczkowski while you're here for the form
 - Complete and leave here with receipts or send in after workshop
- Post-workshop Survey your only fee for attending Bressler will share a week or two after workshop – <u>please complete!</u>

