Dive Deeper III

A multi-state environmental education summit spotlighting innovative teaching about water

Event Program

Thursday, September 22, 2016
The Central Hotel & Conference Center
Harrisburg, PA
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<tr>
<th>Time</th>
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<tr>
<td>8:15 a.m.</td>
<td>Registration, Exhibits, &amp; Refreshments</td>
<td>Atrium</td>
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<td>8:45 a.m.</td>
<td><strong>Opening Remarks:</strong> Jennifer Fetter</td>
<td>Central A/B</td>
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<td>9:00 a.m. -</td>
<td><strong>Keynote Speaker:</strong> Derek Cabrera</td>
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<td>9:45 a.m.</td>
<td>Thinking Differently About Water</td>
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<td>10:00 a.m. -</td>
<td><strong>Concurrent Sessions 1</strong></td>
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<td>10:45 a.m.</td>
<td>Applying Systems Thinking to Solving Water Problems</td>
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<td>Derek &amp; Laura Cabrera</td>
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<td>Water Isn’t Magic</td>
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<td>Brian Oram, Jim O’Connell</td>
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<td>11:00 a.m. -</td>
<td><strong>Concurrent Sessions 2</strong></td>
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<td>11:45 a.m.</td>
<td>The Schoolyard Guide to Stormwater</td>
<td>Central C</td>
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<td>Kristen Kyler</td>
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<td>Climate Change &amp; Watersheds</td>
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Thank you to our sponsor: Capital Region Water
### Agenda (afternoon)

**11:45 a.m.  ** **Lunch, Exhibits, & Networking**  Central A/B

**12:45 - 1:30 p.m.**

#### Concurrent Sessions 3

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**1:45 - 2:30 p.m.**

#### Concurrent Sessions 4

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**2:40 p.m.**

#### General Session:

**Jennifer Fetter**

Rain to Drain—Slow the Flow

**3:25 p.m.**

#### Closing Remarks: Jennifer Fetter

Central A/B

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Thank you to the PA Dept. of Environmental Protection EE Grant Program for supporting the cost of the Rain to Drain kits
Keynote Speaker:

**Derek Cabrera, Thinkwater**

**THINKING DIFFERENTLY ABOUT WATER**

Dr. Derek Cabrera, Co-PI of Thinkwater, and co-author of the new book, *Systems Thinking Made Simple: New Hope for Solving Wicked Problems* will present a synopsis of decades of his research and experience with teaching Systems Thinking across a broad range of subject domains, including policy analysis, business, and education. This session provides an introduction to the DSRP methodology that draws on four simple rules that underlie all systems thinking, and how you can apply that to water education.

Dr. Derek Cabrera holds a PhD from Cornell University, is author of eight books and an internationally recognized expert in metacognition and systems thinking. His contributions to the field of systems thinking and metacognition have been integrated into NSF, NIH, and USDA-NIFA programs nationwide. Dr. Cabrera is a Co-PI of Thinkwater, a USDA-funded initiative to apply systems thinking to issues related to water and water security. He has authored numerous book chapters and peer-reviewed journal articles and his research has been profiled in peer-reviewed journals, trade magazines, and popular publications. As a member of faculty at Cornell University he designed and teaches several graduate courses on systems thinking Cornell’s Institute for Public Affairs. He was Research Fellow at the Santa Fe Institute for the Study of Complex Systems. Derek was also National Science Foundation IGERT Fellow in Nonlinear Systems in the Department of Theoretical & Applied Mechanics at Cornell University. As a National Science Foundation postdoctoral fellow he developed new techniques to model systems approaches in the evaluation of Science, Technology, Engineering and Mathematics (STEM) education programs. Derek was awarded the Association of American Colleges and Universities' K. Patricia Cross Future Educational Leaders Award. Prior to this work, Derek was a mountain guide and educator with Outward Bound and other experiential education programs around the world for more than twenty years. His theoretical models of systems thinking have made impact worldwide, and he is US patent holder and inventor of the DSRP diagramming method, the VMCL model of organizational design, the tactile manipulative, ThinkBlocks, and MetaMap software - a suite of systems thinking tools used in K-12, higher education, NGOs, government agencies, corporations, and business schools. He is a senior research scientist at Cabrera Research Lab, and lives in Ithaca, New York with his wife and three children.
Afternoon General Session:

Jennifer Fetter, Penn State Extension
RAIN TO DRAIN - SLOW THE FLOW

Rain to Drain - Slow the Flow is a new, innovative, fun, hands-on stormwater education curriculum, available from Penn State Extension. This experiment style series of activities leads youth and adults to a better understanding of the movement of stormwater in natural and developed communities. It's also a great introduction to green infrastructure and stormwater best management practices. In this session, everyone will get a chance to participate in the hands-on activity, in what might be the largest-ever simultaneous demonstration of this new curriculum. The first 100 registrants at Dive Deeper III will also receive a free kit of materials to recreate this activity with youth in their communities.

Jennifer Fetter is a Watershed Youth Development Educator with Penn State Extension. Jennifer’s 10 year career with Penn State Extension features bringing youth water education to the forefront. Serving as a liaison between experts in the fields of water resources and youth development, she has overseen the creation of multiple award winning educational resources that help youth and adults better understand the critical issues surrounding water in our communities. Fetter also coordinates volunteer efforts as part of the Greening the Lower Susquehanna program. Prior to working for Penn State Extension, she also served as an Environmental Education Specialist with PA DCNR. Jennifer earned her Master’s and Bachelor’s in Biology from Villanova University.

Opening and Closing Remarks:
Jennifer Fetter, Penn State Extension - Watershed/Youth Development Educator

Sponsors & Supporters:
The Dive Deeper II Summit is made possible in part by the generous sponsorships provided by:

- Capital Region Water
- PA Department of Environmental Protection EE Grant Program - Rain to Drain Kits

Please take a moment to join us in thanking our supporters. Their contributions help reduce the costs passed on to you in your summit registration fees.
Concurrent Sessions 1:  
10:00-10:45 a.m.

**Applying Systems Thinking to Solving Water Problems**  
(Presented in Central A/B)  

*Derek & Laura Carbera, Thinkwater*

Drs. Derek & Laura Cabrera, Co-PIs of Thinkwater, will demonstrate the systems thinking approach using their research recently completed under a multi-year USDA-AFRI Initiative, Thinkwater, on many issues related to water, including the Water-Energy-Food Nexus. The purpose of the workshop will be to explore the application of systems thinking methodology as a means to facilitating multi-stakeholder problem solving on issues related to water education, research, and outreach.

Derek’s complete bio can be found in the keynote speaker section of the program.

Laura Cabrera is a well-known educator, evaluator, and expert in research methods, with a particular focus on assessing educational outreach programs. She currently teaches four graduate level courses at the Cornell Institute for Public Affairs. In addition, she is both a Co-PI, and the acting Executive Director of Thinkwater, a USDA-funded initiative designed to teach people differently about issues related to water. She was a senior researcher at Cornell University’s Family Life Development Center and has more than fifteen years of research and teaching experience at Cornell University where she taught coursework on Families and Social Policy in Cornell’s Department of Human Development. Prior to her work at Cornell, Laura conducted research at the National Academy of Sciences Institute of Medicine, The U.S. Department of Health and Human Services, and The U.S. Department of Justice. Laura is author of five books and holds a PhD in Policy Analysis and Management and a Master's in Public Administration, and a bachelor’s degree, all from Cornell University. Laura welcomes the opportunity to educate any audience on the imperative of teaching systems thinking and on how systems thinking skills help parents, teachers, and other professionals reach their goals for their children, students, or employees.

**Water Isn’t magic**  
(Presented in Central C)  

*Diane Oleson & Bryan Swistock, Penn State Extension*

You have your drinking water supplied by a public supplier. There should not be any problems, right? Then why is Flint, Michigan having lead problems? Learn about municipal systems and some of the water quality problems of municipal systems and the valuable resource that is our water supply.

Diane Oleson is an Extension Educator in Natural Resources in York County, Pennsylvania. She is a biologist by training, holding a BS from Penn State University and an MS from the SUNY at Brockport. Ms. Oleson
conducts educational programs on private drinking water safety, watershed issues, pond management, and invasive species.

Bryan Swistock is a Water Resources Extension Specialist in the College of Agricultural Sciences, Department of Ecosystem Science and Management at Penn State University. He received a bachelor’s degree in Environmental Health from Indiana University of Pennsylvania and a master’s degree in Environmental Pollution Control from Penn State University. For the past 28 years he has conducted research, teaching and extension programs on emerging water resources issues throughout Pennsylvania.

Know Your H2O?
(Presented in Central D)
Brian Oram, Water Research Center & Jim O’Connell, Resource Media

Do You Know Your H20? is an approach to public education and outreach that starts at a grassroots level your home. In this program, we use a combination of web-based tools and phone applications linked to social media to engage the public and young adult on a global basis.

Brian Oram is the manager and educational specialist working with the organization known as the Keystone Clean Water Team. The Keystone Clean Water Team is a 501c3 based in Pennsylvania. He has over 26 years’ experience in training young adults and citizens in the application and use of water quality data to gauge the environment and engage the public.

Jim O’Connell is the founder of Resource Media. He has 30 years’ experience in the visual communication field which includes developing brands, advertising, print design, magazine publication and website development. He currently works with entrepreneurs and small business owners to leverage the power of the internet and social media. He prefers working closely with clients to understand their goals in order to use online marketing tools as means to that end.

Concurrent Sessions 2:
11:00-11:45 a.m.

The Schoolyard Guide to Stormwater
(Presented in Central C)
Kristen Kyler, Penn State Agriculture & Environment Center

Learn how to use the Homeowner’s Guide to Stormwater and stormwaterguide.org to teach students how to map and evaluate stormwater runoff on a school property. You will also learn about simple practices that can be used, potentially as student service projects, to reduce that stormwater.

Kristen Kyler is the Lower Susquehanna Initiative Project Coordinator for the Penn State Agriculture and Environment Center. She has been with the AEC since 2012 coordinating partnerships, like the Conewago Creek Initiative, and assisting with various projects aimed at improving local water quality. She has an Environment Resource Management B.S. degree from Penn State and is working towards a M.S. in Public Administration from Penn State Harrisburg.
Concurrent Sessions 2 (cont’d):

**11:00-11:45 a.m.**

**Climate Change and Watersheds**
(Presented in Central D)

*Melinda Hughes, Nature Abounds*

With climate change, Pennsylvanians are facing new threats and so are our watersheds as well as ecosystems in general. In this session, find out what is happening, what is expected to happen, and how youth can be part of the solution.

Melinda Hughes is the President and Co-founder of Nature Abounds, a national non-profit bringing people together for a healthy planet through volunteerism and environmental stewardship. Prior to co-founding Nature Abounds, Melinda was the Manager of Volunteer and Community programs for the National Wildlife Federation, and she was also the former National Programs Director for the Environmental Alliance for Senior Involvement (EASI). Melinda has over 20 years of volunteer management experience and has been a Certified Volunteer Administrator by the Council for Certification in Volunteer Administration since 2007. She holds a Bachelor’s Degree in Communications and a Master’s Degree in Environmental Law and Policy.

**Connecting Healthy Soil to Clean Water**
(Presented in Central E)

*Lane Whigham and Bill Chain, Chesapeake Bay Foundation*

Join a discussion on how healthy soil contributes to clean water. We’ll take a close look at how soil nutrients and sediment impact our water and how agricultural best management practices ensure healthy farms and clean water. We’ll then examine several ways that these ideas can be introduced and studied with students.

Lane Whigham has been managing the Chesapeake Bay Foundation’s Pennsylvania Student Leadership Program since July, 2015. He coordinates leadership and student advocacy activities for students in a variety of school districts and youth organizations in Pennsylvania’s Chesapeake watershed region. From 2011-2015, Lane worked as a school administrator, managing a special education school in Cumberland County Pennsylvania, a school that specialized in experiential education. During his tenure, he was instrumental in designing the school’s first vocational program. Prior to his work as an administrator, Lane was a special education English teacher. Lane also worked for 6 years as a contracted multi-media specialist with a Federal Emergency Management Agency training facility. Lane has spent several years working at his family’s replacement heifer farm in Carlisle, Pennsylvania and he raises organic chickens at his home in Walnut Bottom Pennsylvania. He has a B.A. in English from Wilson College and is currently graduate candidate at Shippensburg University where he is completing his degree in Special Education.

Bill Chain is the Agricultural Senior Manager for the Chesapeake Bay Foundation, a former Ag teacher, and a former school superintendent.
Concurrent Sessions 3:
12:45-1:30 p.m.

A Watershed Approach with Pennsylvania State Parks
(Presented in Central C)
*Carissa Longo, DCNR - Bureau of State Parks*
Everything needs water; even your students! Join Carissa Longo, Environmental Education Program Coordinator for the Bureau of State Parks, to learn about DCNR’s Watershed Education (WE) curriculum. This award-winning, standards-based cross-curricular approach to water quality monitoring studies the watershed as a whole. This session will highlight the new responsive WE Water Quality Monitoring database and the new WE Website. Participants will leave this session with samples from the curriculum.

Carissa Longo is the Environmental Education Program Coordinator for DCNR- Bureau of PA State Parks. She coordinates the following curricula for the bureau: DCNR Watershed Education, DCNR PA Land Choices, Project WET, and Project Learning Tree (PLT). Carissa is a NAI Certified Interpretive Guide (CIG).

Green Schools + Sustainable Education = Blue Waters for Pennsylvania
(Presented in Central D)
*Estelle Ruppert, Green Schools-Blue Waters - Center for Schools & Communities*
Go Green! Learn what Pennsylvania is doing to encourage green and healthy schools that promote sustainable actions while helping the watershed! Review current research about EE in PA and Green STEM initiatives that advance sustainable education concepts and curriculum. The session will introduce PDE’s Pathways to Green Schools and Eco SchoolsUSA endorsed by the PA Green and Healthy Schools Partnership.

Estelle Ruppert is an Adjunct Professor at Lebanon Valley College- (MSE/STEM Education) and a consultant for Green Schools/Blue Waters with the Center for Schools and Communities, She is an active board member for the PA Green and Healthy Schools Partnership, and the Legislative Director for the Pennsylvania Association of Environmental Educators - honored with the 2012 Keystone State Environmental Education Award among other education awards. She authored DCNR’s PA Land Choices and continues to support environmental and sustainable education.
Concurrent Sessions 3 (cont’d):
12:45-1:30 p.m.

**Tracking Invasive Species with iMapInvasives**
(Presented in Central E)

*Amy Jewitt, Western Pennsylvania Conservancy*

iMapInvasives is a new and engaging tool that's being used by a variety of people to track location information for invasive species. Pennsylvania recently started utilizing iMapInvasives and is hoping to raise awareness for the database and its usefulness as a tool for Early Detection and Rapid Response.

Amy Jewitt is a 2009 graduate of Penn State with a B.S. in Agricultural Science. She currently serves as an administrator of the Pennsylvania iMapInvasives database, valuing her work in this role as iMapInvasives continues to be a valuable tool to those working to rid our natural environment of invasive species.

Concurrent Sessions 4:
1:45-2:30 p.m.

**Wikiwatershed.org Toolkit from the Stroud Water Research Center**
(Presented in Central C)

*Steve Kerlin & Tara Muenz, Stroud Water Research Center*

Stroud Center educators will highlight citizen science and education tools from the new wikiwatershed.org community website. Attendees will learn about the new online Model My Watershed GIS, the Water Quality mobile app for smartphones and tablets, and the Trout Grow on Trees® program.

Steve Kerlin, Ph.D. is the Director of Education at the Stroud Water Research Center. He manages the planning, implementation, evaluation, and research of face-to-face and online water education programs to diverse audiences. Dr. Kerlin is a former middle school science teacher and university professor of science and environmental education. Tara Muenz is an aquatic ecologist and currently Stroud Center's Assistant Director of Education. Her interests focus on cultivating the stewardship and conservation of watersheds through citizen science initiatives and community engagement. Tara earned her B.A. in zoology from Miami University in Oxford, Ohio, and her M.S. in conservation ecology and sustainable development from the University of Georgia's Odum School of Ecology.
Tara Muenz is an aquatic ecologist and currently Stroud Center's Assistant Director of Education. Her interests focus on cultivating the stewardship and conservation of watersheds through citizen science initiatives and community engagement. Tara earned her B.A. in zoology from Miami University in Oxford, Ohio, and her M.S. in conservation ecology and sustainable development from the University of Georgia’s Odum School of Ecology.

**LeTort Stream Studies - The Past, Present & Future of a Model Watershed Ed. Program**  
*(Presented in Central D)*  
**Holly Smith, Audubon Pa**

Since 2011, Audubon Pa has been leading mandatory 2nd and 5th grade stream study field trips for Carlisle area students. Learn how this program has been redesigned and enhanced, and expanded to include a 7th grade module. Now, 1,100 students per year experience hands-on learning that links aquatic insects, riparian habitat, land use and stormwater runoff to water quality. This presentation recaps the trajectory of this program and the vision for its future.

*Holly Smith has a BS in science education and an MS in geoenvironmental studies, both from Shippensburg University. Her work with Audubon Pa includes enhancing elementary science curricula, and shaping and leading the LeTort Stream Study program in partnership with Carlisle Area School District. She is also a Project WET facilitator.*

**Engaging Curriculum to Learn, Protect & Promote Water!**  
*(Presented in Central E)*  
**Kelly Lowery, Penn State Pesticide Education Program**

Come explore our new engaging water curriculum! We will share several replicable resources for formal and informal educators on teaching water pollution, water protection, and good practices to youth. Designed for classroom lessons and outreach events, discover how our interactive curriculum can be used with your learners!

*Kelly Lowery, in her current role with the Pesticide Education Program, Penn State Extension, develops curriculum resources, facilitates trainings, and delivers programs for applicators, educators, consumers, youth, and other audiences. Kelly has a B.S. in Agribusiness Management and M.Ed. in Adult Education from The Pennsylvania State University.*
Exhibits:

**8:00 a.m. - 3:30 p.m.**  
Ballroom Hallway

Please take some time during registration, session breaks, and lunch to visit our many fabulous exhibitors for more information and resources about water education. Special thanks to our exhibitors for providing these resources today:

**Capital Region Water:** Capital Region Water is a special-purpose unit of local government that improves, maintains, and operates the greater Harrisburg area’s water system and infrastructure — from raindrop to river. Capital Region Water is the steward for drinking water, wastewater and stormwater services for the City of Harrisburg and portions of surrounding municipalities including Penbrook, Paxtang and Steelton Boroughs and Susquehanna, Swatara and Lower Paxton Townships.

**Chesapeake Bay Foundation:** CBF's environmental education opportunities link the natural environment and human culture of the Chesapeake Bay watershed. They enable students and teachers to conduct their own research through biological sampling, chemical analysis, and physical measurements. In addition to using critical thinking skills to evaluate the health of the ecological system, participants also gain a unique perspective in the relationship between water quality, fisheries, and economics. Innovative teaching methods and a knowledgeable, enthusiastic staff have put CBF at the vanguard of the environmental education movement. The result is an exceptionally informed and inspired constituency that values the Bay and its watershed as a living, connected system.

**Dauphin County Parks & Recreation:** Wildwood Park is a 200-acre urban park used for environmental education, birding, nature photography, and hiking. The cornerstone of the park’s unique character is the 90-acre wetland and lake. A nature center hosts state-of-the-art exhibits and is a meeting place for school and public environmental education programs focusing on wetlands and watersheds.

**DCNR—Bureau of State Parks:** The primary purpose of Pennsylvania state parks is to provide opportunities for enjoying healthful outdoor recreation and to serve as outdoor classrooms for environmental education. Our curriculums: • Watershed Education (WE) • PA Land Choices • GO Teach- Hiking, GPS, Snowshoeing • PA Songbirds (partnership with PGC) • Project Learning Tree (PLT) (partnership w/ PAEE).
**Nature Abounds:** Nature Abounds, a national non-profit bringing people together for a healthy planet through volunteerism and environmental stewardship. Since incorporating in 2008, Nature Abounds has launched several signature opportunities IceWatch USA, Watch the Wild, Turtle Ambassadors, Climate Change Ambassadors, and Knitter’s for Nature’s Critters. Nature Abounds has also revitalized the Senior Environment Corps (SEC), engaging senior volunteers in restoring and protecting the environment.

**Penn State Agriculture & Environment Center Greening the Lower Susquehanna:** Greening the Lower Susquehanna, coordinated by the Penn State Agriculture and Environment Center, provides tools, resources, and opportunities for individuals, organizations, businesses, and municipalities to improve local water quality in the Lower Susquehanna region. Current projects include promotion of the First Investigation of Stream Health citizen science monitoring protocol, the provision of free trees from a small native tree nursery, and the coordination of a volunteer corps.

**Penn State Earth & Environmental Systems Institute:** EESI hosts a project to monitor the quality of water in the waterways of Centre County, specifically the Black Moshannon Creek, above and below shale gas wellpads. Using water quality monitoring, young adults learn about field research and develop their interests. This is a collaboration between the Earth & Environmental Systems Institute at Penn State University and students from State College Area High School. Students are trained by their Earth Science teachers and Penn State experts.

**Penn State Pesticide Education Program:** The Penn State Pesticide Education Program (PEP) is responsible for teaching chemical safety to protect families, individuals, and the environment. Several available resources focus on potential water contamination, pollution related to pesticides, and protecting water sources.

**Penn State Extension Master Watershed Stewards:** The Master Watershed Steward program was created to draw new faces from the community and give trainees the tools to engage in natural resource volunteer work. In York County it is a collaboration of Penn State Extension, the York County Conservation District and the Watershed Alliance of York. We are helping to recruit new conservation volunteers, and engage the public in conservation outreach, education, and service.

**Penn State Extension 4-H Youth Programs:** Pennsylvania’s 4-H programs offer a wide variety of opportunities and curriculum resources to engage in youth in Water Education and other areas of Environmental Science (forestry, wildlife, entomology, and more). Youth in 4-H learn through hands-on experiential and inquiry-based activities designed to enhance STEM in and out of the classroom.

**Pennsylvania Association of Conservation Districts:** PACD is a nonprofit organization working to enhance locally led efforts that support the wise use of the state’s natural resources. The PACD primarily serves as the collective voice for Pennsylvania’s 66 county conservation districts. For more information about PACD, visit www.pacd.org.
Exhibits (continued):

8:00 a.m. - 3:30 p.m.    Ballroom Hallway

Pennsylvania Department of Environmental Protection: The Department of Environmental Protection’s (DEP) exhibit will highlight funding opportunities for water-related education projects. DEP’s mission is to protect Pennsylvania’s air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment.

Stroud Water Research Center: Driven by the philosophy that understanding the science of fresh water is fundamental to our ability to protect the integrity of this finite and vital resource, the Center seeks to disseminate its research findings to its peers in the scientific and educational communities, as well as businesses, landowners, policy makers and individuals, to enable informed decision making that affects water quality and availability in our local communities and the world around us. We accomplish our goals through our pursuit of both basic and applied scientific research, as well as through educational programs, which serve audiences ranging in age from elementary school children to adults in continuing education programs.

Western Pennsylvania Conservancy: iMapInvasives - The Pennsylvania iMapInvasives database is an online, GIS-based reporting and data management tool for tracking invasive species. The goal of iMapInvasives is to assist natural resource professionals and those interested in tracking invasive species in understanding the distribution of species populations across Pennsylvania and to provide a tool to store both location and management details.
Watershed Decisions

A hands-on, inquiry based activity that helps older youth and adults learn about water quality issues surrounding small watersheds and the decision making processes that go into improving those water quality issues.

As new members of a local community organization interested in improving local water quality, participants examine simulated water samples, explore the land users in their community, and then create a plan for improving their watershed on a limited budget. There is no one solution to this activity and the results are dependent upon the creativity, opinions, and ideas of the participants.

- Designed for use with 2 or more small groups of 4-10 people each
- Geared towards adults and older youth (aged 12-18) with a basic understanding of watersheds

Available for your classroom, educational program, youth group, municipality, watershed association, or any other group interested in exploring this vital topic.

$30.00 per kit
Kit includes:
- 1 Lesson Plan (with copy pages)
- 2 Watershed Activity Boards
- 2 Sets of Activity Components (cups, cards, envelopes)

For larger groups, additional bundles of 1 activity board and 1 set of activity components available for purchase after initial purchase for $12.00 each.

Additional shipping and handling costs may be required.

To purchase, contact Jennifer Fetter
Watershed/Youth Development Educator:
(717) 921-8803
4Hwater@psu.edu

This publication is available in alternative media on request.
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extension.psu.edu
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