Disconnecting Existing Impervious Area Runoff from Stormwater Drainage Systems Expert Panel

The Center for Watershed Protection, Inc. submits the following proposal to Virginia Tech to assemble an Expert Panel to evaluate the nutrient and sediment removal and runoff reduction benefits associated with disconnecting existing impervious area runoff from stormwater drainage systems. The proposed scope and charge of the panel includes investigation into the following methods of crediting impervious disconnection:

1. Disconnection to pervious areas that are amended with compost and/or vegetative plantings
2. Monitoring or modeling to document that existing impervious areas are already disconnected
3. Evaluation of the site and drainage networks to determine if it can be retrofit to achieve full disconnection via soils modification, vegetative plantings, changes in flow paths and/or retention within the drainage network, followed by modeling to determine if it achieves the full disconnection benchmark established by the Panel

The Center's experience with both the Chesapeake Bay Program (CBP)'s Expert Panel process and with design and performance evaluation of stormwater retrofits make the organization uniquely qualified for this work. The proposed Expert Panel Chair, Membership, Scope of Work, and Timeline are provided below.

Expert Panel Chair:
Bill Stack, Deputy Director of Programs at the Center for Watershed Protection, will chair the Expert Panel on Impervious Disconnection (ID). Bill is a professional engineer with more than 35 years of experience in water resources management. As the Sediment Reduction and Stream Restoration Coordinator for the CBP for the past three years, Bill co-led the Expert Panel on Stream Restoration, led the development of revised recommendations on Stream Restoration for the "test drive period," coordinated the Urban Shoreline Erosion Control Expert Panel, and participated on the Urban Stormwater Retrofits and Nutrient Discharges from Grey Infrastructure Expert Panels. His CV is provided as an attachment to this proposal.

Expert Panel Membership:
The ID Expert Panel will include the following individuals who are recognized topic experts and have expertise in environmental and water quality related issues. The panelists have indicated their commitment to serve on the Panel with letters of support, which are provided as attachments to this proposal along with their CVs.

1. *Joe Battiata, Senior Water Resources Engineer, Center for Watershed Protection:* Joe is a professional engineer with 18 years of experience in stormwater management, including design and implementation of stormwater retrofits, development of design specifications for stormwater BMPs and computations to demonstrate compliance with stormwater regulations. Joe led the development of the BMP specification on impervious cover disconnection for the Virginia Department of Conservation and Recreation's Stormwater Handbook and was a member of the CBP Expert Panel on Urban Filter Strips/Stream Buffer Upgrades.
2. *Dr. Gregory Evanylo, Professor and Extension Specialist, Crop and Soil Environmental Sciences, Virginia Tech:* Dr. Evanylo has expertise in chemistry, bioavailability, transport and environmental effects of nutrients, trace elements, and organic matter in land-applied residual by-products. He is internationally recognized for his Extension programming and applied research on composting, nutrient management, and fate of carbon and metals in land-applied residuals.
3. *Jason Papacosma, Watershed Programs Manager, Arlington County, VA Department of Environmental Services:* Jason has 16 years of experience in all aspects of watershed and MS4 Permit management, including leading the County's effort to conduct retrofit inventories

for all its watersheds, development of stormwater regulations, stormwater plan review, stormwater facility inspection, and water quality monitoring. He was a member of the CBP Expert Panel on Urban Stormwater Retrofit Projects.

4. *Steve Stewart, Natural Resources Manager, Baltimore County, MD Department of Environmental Protection and Sustainability:* Steve has 25 years of experience in all aspects of watershed and MS4 Permit management, including watershed management plans, monitoring, and TMDLs. He was a member of the CBP Expert Panels on Urban Stormwater Retrofits, Urban Stream Restoration, and Urban Filter Strips/Stream Buffer Upgrades.
5. *Ryan Winston, PE, Doctoral Student, Department of Biological and Agricultural Engineering, NC State University:* Ryan has extensive experience conducting research on the performance of a wide variety of stormwater BMP retrofits. He was a member of the CBP Expert Panel on Urban Filter Strips/Stream Buffer Upgrades.
6. *David Sample, PhD, PE, D. WRE, Assistant Professor and Extension Specialist, Virginia Tech:* Dr. Sample conducts research to improve the water quality performance of existing and new urban stormwater infrastructure.
7. *Franco Montalto, PhD, PE, Associate Professor, Drexel University Department of Civil, Architectural and Environmental Engineering:* Dr. Montalto**:** conducts research on runoff reduction performance of green infrastructure practices, and is co-chair of ASCE-EWRI Technical Committee on Low Impact Development Computational Methods.

In addition to the topic experts, the Panel membership will include a representative from the CBP Watershed Technical Work Group (WTWG) and a representative from the CBP modeling team, to be assigned by the CBP. An additional regulatory support person will be provided by EPA Region III. All Panel members will be asked to disclose any potential conflicts of interest prior to serving on the Panel.

Scope of Work:
The specific tasks to accomplish the project objectives are described below.

Task 1. Assemble Panel
The Center will work with the Panel Coordinator to draft the scope and charge of the Panel for review by the source sector Workgroups, the Water Quality Goal Implementation Team (GIT) Chair and Vice Chair, and the other GITs. The Scientific and Technical Advisory Committee (STAC) will also be afforded the opportunity to comment before final approval. The Center will revise the Panel scope and charge and membership based on input from these various stakeholders and will contact approved panelists about moving forward. A brief description of the key Panel roles is provided below:

- Panel Coordinator: The Panel coordinator will assist the Panel Chair and the Panel to help them deliver a quality report in the specified timeframe by providing logistical support (scheduling calls/meetings, operating webinar and conference lines, etc.) and strategic guidance on the expert panel process. He/she will also serve as liaison between the Expert Panel and the wider CBP partnership.
- Panel Chair: The Chair will be the chief strategist and panel lead. The Chair will work with the Coordinator and Panel members to assign specific tasks and ensure the Panel is on schedule. The Chair will use his/her expertise to facilitate productive technical discussions among the panelists. The Panel Chair and Panel members are responsible for developing the Expert Panel report that conforms in form and content with the *Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model* (CBP BMP Protocol).
- Panel Members: The Expert Panel is responsible for following the specific charge of the Panel, as well as adhering to the BMP Protocol. Panelists will participate and offer their own unbiased

expertise and best professional judgment throughout the process, and will perform assigned or voluntary tasks that assist the development of the final Panel report.

- Modeling Team Representative: The modeling team representative will serve as liaison between the CBP modeling team and the Expert Panel, relaying and responding to questions that the Panel has for the modeling team regarding the simulation or incorporation of the BMP(s) into Phase 6 of the CBP Watershed Model, Scenario Builder, or other modeling tools. He/she will also assist with the development of the Technical Appendix, which accompanies each Panel report.
- WTWG Representative: The WTWG representative serves as a Panel member to offer his/her expertise with BMP tracking and reporting, which is a crucial piece of the Panel's final report.
- EPA Region III Representative: This representative will serve as a resource for regulatory questions that may arise during the Panel's work.

Panel support will be provided by the Center for Watershed Protection staff Reid Christianson, who will assist with literature review and synthesis as well as review of modeling/monitoring approaches to document disconnection.

Task 2. Literature Review and Synthesis

The Expert Panel chair will coordinate a review and synthesis of the literature (published/academic and gray literature) on the nutrient, sediment and runoff reduction performance of ID. The literature search will focus on the following major research questions:

1. What existing methodologies (models, etc.) are available to assess the degree of impervious disconnection?
2. What is the nutrient, sediment and runoff reduction performance of soil/vegetative/hydrologic modifications to pervious areas that accept runoff redirected from existing impervious cover?
3. How do site, design and maintenance characteristics (e.g., slope, size of impervious area, soil type) affect this performance?

The Panel will search for relevant academic literature through university databases that provide access to numerous journals in the ecological, hydrologic, engineering and biological sciences. Internet searches will also be conducted to look for other relevant materials such as technical reports, state/local stormwater manuals, or impervious cover based-TMDL plans that may provide documentation of methods to assess impervious disconnection. The abstracts of all relevant articles will be obtained and read and, if the data presented is relevant to the research questions, the publication will be obtained and entered into a catalog. Articles will be cataloged with complete reference information. The Panel Chair and Coordinator will determine the interface most suitable to share publications with the Expert Panel (i.e., Sharepoint or other web-based sharing software)

All of the literature entered into the catalog will be read to extract key information and to make an assessment of the study's relevance as well as the reliability of the resource. Key information that will be summarized includes: type of study, methods used, timeframe, geographic location, and relevant findings, including ancillary benefits of the BMP. Where studies with negative pollution reduction data are found, they will be considered the same as all other data. Data sources will be characterized according to the data source characterization matrix and other considerations described in the CBP BMP Protocol in order to determine how much influence (i.e. 'weight') the data should have on resulting estimates. A summary report will be developed that synthesizes the major findings of the literature review.

Task 3. Panel Meetings

The Panel Chair will convene up to eight Panel meetings, including a stakeholder forum, to facilitate productive technical discussions among the panelists. Meetings #2 and #6 will be held at the CBP in Annapolis and the rest will be held by telephone conference. The Panel Chair will prepare materials

for presentation at each Panel meeting and identify key questions to guide the discussion. At least one Panel meeting will be dedicated to review/discussion of the literature review results and one meeting will be centered around preliminary (strawman) recommendations for developing effectiveness estimates.

The second Panel meeting will be dedicated to an open stakeholder forum where interested parties, other than the Expert Panel members, can share and present scientific data with the Panel members. The intent is to provide an open exchange of information that may help inform the Panel as it moves forward with its deliberations. The Center will lead the Forum, which will be a half day meeting to be held at the CBP in Annapolis. At this meeting, the Panel Chair will present the charge of the Panel and will solicit feedback from attendees on specific issues to address with the Panel and relevant resources and research. The first part of the meeting will be open to stakeholders and the second part will constitute just the Panel members.

Task 4. Develop Report

The Expert Panel will use the literature synthesis and results of discussions at Panel meetings to develop a draft report that includes the following:

- Identity and expertise of Panel members
- Practice name/title and detailed definition
- Recommended nitrogen, phosphorus, sediment loading and runoff reduction effectiveness estimates
- Justification for the selected effectiveness estimates, including a list of references used and a detailed discussion of how each reference was considered, or if another source was investigated, but not considered.
- Description of how best professional judgment was used, if applicable
- Land uses to which the BMP is applied
- Load sources the BMP will address and potential interactions with other practices
- Description of pre-BMP and post-BMP circumstances, including the baseline conditions for individual practices
- Conditions under which the BMP works/does not work/or varies in its effectiveness
- Temporal performance of the BMP including lag times between establishment and full functioning (if applicable)
- Unit of measure (e.g., feet, acres)
- Locations within the Chesapeake Bay watershed where this practice is applicable
- Useful life; effectiveness of practice over time
- Cumulative or annual practice
- Description of how the BMP will be tracked, reported, and verified:
- Suggestion for a review timeline
- Outstanding issues that need to be resolved in the future and a list of ongoing studies, if any
- Documentation of any dissenting opinion(s) if consensus cannot be reached
- Operation and maintenance requirements and how neglect alters performance
- Any ancillary benefits or unintended consequences beyond impacts on nitrogen, phosphorus and sediment loads.
- A technical appendix that describes changes that will be made to the modeling and reporting tools to accommodate the BMP(s).

Task 5. Approval Process

The Panel Chair will work with the Panel Coordinator to go through the CBP review and approval process. This will involve presenting the draft recommendations to the Urban Stormwater Work Group (USWG), WTWG and the WQGIT and addressing and responding to any comments received

during the comment period. The budget and schedule assume only one meeting with each workgroup plus two additional meetings with the Modeling Team if needed. Any additional meetings would be subject to additional expenses and an extension of the timeline. The Chair will seek the Panel's input in the event that significant comments are made, or major revisions are requested, as the report is reviewed by the CBP partnership. Although the Panel Chair and Coordinator are responsible for managing the comment process, Panel members may be expected to address and respond to comments received during the comment period, as appropriate.

Project Timeline:
The project will be completed over a 12-month timeframe as shown in Table 1. The estimated start date for this work is May 2015.

Table 1. Project Timeline

Task	**Key Deliverables**	**Completion Date (Months from Award)**
Task 1. Assemble Panel	Final panel charge and membership	Month 1
Task 2. Literature Review and Synthesis	Catalog of research studies Synthesis report	Month 3 Month 4
Task 3. Panel Meetings	1st panel meeting 2nd Panel meeting and stakeholder forum 3rd Panel meeting 5th Panel meeting 4th Panel meeting 6th Panel meeting 7th Panel meeting 8th Panel meeting Minutes from the Panel meetings	Month 2 Month 3 Month 4 Month 5 Month 6 Month 7 Month 8 Month 9 Months 3-9
Task 4. Develop Report	Draft Panel report	Month 9
Task 5. Approval Process	Review and approval by USWG Review and approval by WTWG Review and approval by WQ GIT Final approved report with recommendations	Month 10 Month 11 Month 12 Month 12

Areas of Expertise

Bill has expertise in managing water resource protection and restoration programs related to water supply and source water protection, urban stormwater management, agricultural non-point source control, and flood management. This expertise includes a thorough understanding of environmental laws and the programmatic needs of government agencies to meet these laws including regulatory requirements; ordinances and regulations along with capital, operation and maintenance budgets; funding sources (storm water utilities, revenue bonds); watershed plans; and schedules to meet compliance needs.

As Deputy Director of Programs, Bill's principal responsibility is the development of new and innovative projects to support the strategic plan as well as keeping the Center at the forefront of issues affecting the environment. This has involved the development of several proposals and work plans for projects as diverse as stormwater financing studies and ultra-urban watershed planning. Bill is also responsible for staying current of local, state and national programs and regulations and developing position papers on key issues such as Municipal Separate Storm Sewer System and Sanitary Sewer Overflow regulations. Bill has a work history spanning over 38 years and is the senior mentor for technical staff.

Representative Projects

- Chesapeake Bay Program – Stream Restoration and Sediment Reduction Coordinator – This is a 6 year contract with the Chesapeake Bay Program to provide support to improve how stream restoration and other sediment reduction (e.g., tidal shoreline) projects are assigning credits for TMDL accounting. Recent work includes the development of methodologies for crediting stream restoration projects for sediment and nutrients. This work also includes helping in the development of the next Phase of the Chesapeake Bay Watershed model
- Washington, D.C. Stormwater Guidebook. Quality Control. 2008 – Present
  This project entails production of a guidance manual for use by developers and regulators in adhering to and implementing the Washington, D.C. stormwater regulations. As quality control, Bill provides oversight of the guidebook and is working on the redevelopment and fee-in-lieu criteria.
- James River Extreme BMP Makeover. Team Assistant. 2008 –2010
  This project is intended to enhance the nutrient removal performance of urban stormwater BMPs by using research and a series of BMP field assessments to develop the next generation of high-performing stormwater BMPs, focusing on the James River watershed in Virginia. Bill was a team assistant.
- Arlington County Stormwater Projects. Team Member. 2009-Present
  The Center performed a retrofit survey throughout this watershed in Arlington, Virginia. Bill led retrofit field teams, and organized field data.

Previous Positions

- **Chief, Surface Water Management Division, Baltimore City Department of Public Works, 2009-2010**
  Principle "architect" and Chief of the newly created Surface Water Management Division. The "new" Division is comprised of 35 engineers, scientist and support staff and includes an annual operating budget of $4 million and a capital budget of $7 million and is a consolidation of the City's surface water-related programs within the Bureau of Water and Wastewater. This includes the Stormwater Management, Erosion & Sediment Control and Environmental Inspections Sections under the Bureau of General Services (GS), and the Water Quality Management Section and Stormwater Engineering Sections under the Bureau of Water and Waste Water.
- **Chief, Water Quality Management Section, Baltimore City Department of Public Works, 1989-2009**
  Responsible for the City's Municipal Stormwater Permit Program, Drinking Water Reservoir Watershed Management Program, and Flood Warning Program. Managed a staff of 16 engineers and scientists and oversaw an annual operating and capital budget of $5-7 million. Also, involved in numerous water monitoring studies involving urban streams, Baltimore Harbor and drinking water reservoirs and tributaries. Managed over 30 capital projects related to environmental restoration. Served on several committees to address regional water resources issues and served as the Chair of the Patapsco/Back River Team between 1995 and 1998 and was the former Chair of the Board of the Directors of the Maryland Watershed Monitoring Council
- **Pollution Control Analyst Supervisor, Baltimore City Department of Public Works, 1980-1989**
- **Associate Conservation Engineer, Baltimore County Soil Conservation District, 1977-1980**

Education

- Masters of Science, Biology, Towson State University, 1981
- Bachelor of Science, Biology, St. Mary's College of Maryland, 1975

Accomplishments

- P.E., (MD Professional Engineering License, P.E., #17691), 1990 – Present
- 2011, Recipient of the Carl Weber Award by the Maryland Water Monitoring Council
- 2010, Baltimore Ecosystem Study (BES) Director's Award
- 2007, Recipient of the Innovations in Public Service Local Agency Award, presented by the Maryland, Chapter of the Association of Professional Administrators
- 1999, Recipient of the "Senator Bernie Fowler Award" by the Maryland Chesapeake Bay Tributary Strategy Teams
- 1990, Recipient of Award from Exemplary State and Local Awards Program sponsored by National Center for Public Productivity, Rutgers University

Areas of Expertise

Joe joined the Center for Watershed Protection in 2009 and provides expertise in stormwater management technical and administrative program development and implementation, including the development of stormwater regulations, Municipal Separate Storm Sewer System permit compliance programs, structural and non structural Best Management Practices (BMP) sizing, design, and construction specifications, and BMP operation and maintenance guidelines. His experience also includes authoring the first edition of the Virginia Stormwater Management Handbook (Blue Book, 1999), providing updates to the engineering calculations and stormwater BMP design and construction specification chapters of the new Virginia Handbook, and developing and conducting technical training and education programs.

Representative Projects

- Virginia Stormwater Manual Update and Technical Guidance. Project Manager. 2012-2013
  Work with the Virginia Department of Conservation and Recreation (DCR) on multiple tasks related to developing program guidance and implementation tools. Specific tasks included addressing public comments and research related updates to the first draft of the new structural and non-structural stormwater BMP design specifications, and develop new chapters for the Virginia stormwater Handbook on the hydrologic and hydraulic computations for demonstrating compliance with the stormwater quality and channel protection criteria.
- Onancock Watershed Restoration Project. Project Manager. 2011-2014
  Implemented an innovative, whole-community approach to watershed restoration including urban and agricultural best management practice implementation. Conducted a watershed-wide assessment of urban restoration opportunities and identified and ranked proposed stormwater BMP retrofits based on construction and maintenance costs, the reduction of nitrogen phosphorus and sediment for each BMP, community acceptance and visibility. This project also included the design and construction oversight of the first stormwater permeable pavement installation on the Virginia Eastern Shore.
- Virginia Stormwater Regulations and Runoff Reduction Method. Team Assistant. 2008-2010
  Worked with DCR to synthesize stormwater quality data and BMP performance research, including Virginia-specific stormwater quality issues, including coastal, piedmont, and mountain/valley nutrient and sediment concentrations and BMP designs in order to develop a regulatory framework for evaluating stormwater quality and quantity management compliance, including provisions for encouraging and crediting environmental site design: The Virginia Runoff Reduction Method (Technical Memo, CWP, April 2008). Developed design specifications for 15 structural and nonstructural stormwater BMPs; including detailed guidance for design and construction of a basic level (Level I) and an advanced or increased pollutant removal capability level (Level II) performance for each BMP; also developed a compliance spreadsheet tool for evaluating stormwater site planning and BMP implementation. This effort was followed by a statewide training and design charrette workshops to test the method and compliance spreadsheet on real-world site plans.

Previous Positions

- **Senior Water Resources Engineer, Williamsburg Environmental Group, 2008-2009**
  Provided consulting services for private and public clients on stormwater and site design BMPs, including low impact development strategies, stormwater BMP and site retrofit assessments, and alternatives analysis and cost estimates. Provided training for internal and external clients on VSMP permit compliance strategies, including Construction and MS4 General Permits.
- **Regional Regulatory Manager, CONTECH Stormwater Solutions, 2005-2008**
  Provided a leadership role in ensuring that proprietary stormwater treatment and detention products are approved by federal, state, and local regulatory agencies in Maryland, Delaware, Washington D.C., Virginia, West Virginia, North Carolina, and South Carolina. Worked with Internal Research & Development teams to provide guidance and training as needed to ensure that product development is consistent with regulatory agency requirements, manage field monitoring efforts, and coordinate the development of the resulting technical reports.
- **Senior Hydraulics Engineer, Virginia Department of Transportation (VDOT), 2002-2005**
  Provided design guidance and regulatory interpretation for the effective implementation of VDOT's Erosion and Sediment Control & Stormwater Management programs consistent with state laws and regulations. Developed, managed, and provided leadership for the implementation of VDOT's Virginia Pollutant Discharge Elimination System (VPDES) / VSMP Construction and Municipal Separate Storm Sewer System Permit Programs. Coordinated cross-divisional roles and responsibilities in implementing and reporting on the 6 Minimum Control Measures of VDOT's MS4 Permit Program.
- **Stormwater Program Manager, Virginia Dept. of Conservation and Recreation, 1997-2002**
  Managed the Virginia Stormwater Management Program to ensure that state and federal mandates are met through the oversight and regulation of local government and state agency stormwater management programs; developed and implemented statewide program performance goals; managed the development and served as the principal author of the first Virginia Stormwater Management Handbook (Blue Book), a 950 page technical document on stormwater hydrology, hydraulics, regulatory interpretation and stormwater BMP design, construction, and maintenance specifications.

Education

- Bachelor of Science Civil Engineering, The Catholic University of America, 1983

Licenses and Certifications

- Certified MS4 Specialist - 0006
- Applied Fluvial Geomorphology, Wildland Hydrology, Inc., David Rosgen, Fort Collins, CO, 2003
- Professional Engineer: Virginia license# 23542
- Professional Engineer: Maryland license# 16608

CURRICULUM VITA
Gregory K. Evanylo, Ph.D.

Current position:

Professor and Extension Specialist – Soil Environmental Quality
Department of Crop & Soil Environmental Sciences
426 Smyth Hall (0404), Virginia Polytechnic Institute & State University
Blacksburg, VA 24061; Phone (540) 231-9739, email: gevanylo@vt.edu

Education:

Ph.D. 1982 Soil Chemistry and Fertility, University of Georgia
M.S. 1978 Plant and Soil Sciences, University of Massachusetts
B.A. 1975 Biology, University of Connecticut

Other professional experience:

Professor and Extension Specialist: Dept. of Crop and Soil Environmental Sciences, Virginia Tech, Blacksburg, VA 24061: July 1, 2001-present

Associate Professor and Extension Specialist: Dep. of Crop and Soil Environmental Sciences, VPI&SU, Blacksburg, VA 24061; July 1, 1992 - June 30, 2001.

Assistant Professor and Extension Specialist: Dep. of Crop and Soil Environmental Sciences, VPI&SU, Blacksburg, VA 24061; September 1, 1989 - June 30, 1992.

Assistant Professor of Agronomy: Eastern Shore Agricultural Experiment Station, VPI&SU, Painter, VA 23420; June 1, 1984 - August 31, 1989.

Current posts and responsibilities:

Board Representative, Soil Science Society of America Soil and Ecosystem Processes Group, 2015-2017.

W-3170 Multi-State Workgroup (Beneficial reuse of residuals and reclaimed water: Impact on soil ecosystem and human health) Member: 1999 to present; Chair, 2007 to 2013.

Membership in professional organizations:

Soil Science Society of America	American Society of Agronomy
U.S. Composting Council	Virginia Composting Council
Water Environment Federation	Mid Atlantic Biosolids

Selected honors and awards:

American Society of Agronomy and Soil Science Society of America Fellow. 2014. Awarded at ASA and SSSA annual meeting. Long Beach, CA. Nov 2-5, 2014.

Rufus Chaney Award for Research Excellence. U.S. Composting Council, Orlando, FL, January 2010.

Virginia Tech Alumni Award for Excellence in Extension. Virginia Cooperative Extension, 2004.

Selected research journal articles since 2010:

Liu, J.*, D.J. Sample, J. Owen, J. Li*, and G.K. Evanylo. 2014. Assessment of selected bioretention blends for nutrient retention using mesocosm experiments. Journal of Environmental Quality Vol 43, doi:10.2134/jeq2014.01.0017.

Li, J.*, G. Evanylo, K. Xia, and J. Mao. 2013. Carbon (1s) K-edge near edge X-ray absorption fine structure (NEXAFS) spectroscopy for carbon dynamics from long-term application of organic amendments. Soil Science 178:453-464.

Li, J.*, and G. Evanylo. 2013. The effects of long-term application of organic amendments on soil organic carbon accumulation. Soil Science Society of America Journal 77: 964-973.

Li, J.* G.K. Evanylo, X. Zhang, and E.H. Ervin. 2013. Effects of biosolids treatment processes on nitrogen cycling and carbon accumulation under various tillage practices. J. Residuals Science and Technology 10:29-40.

Zhang, X., E.H. Ervin, G.K. Evanylo, J. Li*, and K. Harich. 2013. Corn and soybean hormone and antioxidant metabolism responses to biosolids under two cropping systems. Crop Sci.53:2079–2089. doi:10.2135/cropsci2012.11.0668.

Shan, Dexin, G.K. Evanylo, and J.M. Goatley. 2012. Effects of compost sources and seeding treatments on germination and emergence of four turfgrass species. Compost Science and Utilization. 20:165-170.

Zhang, X., D. Zhou, E.H. Ervin, G.K. Evanylo, D. Cataldi*, and J. Li*. 2012. Biosolids impact antioxidant metabolism associated with drought tolerance in tall fescue. HortScience 47(10):1550-1555.

Dunifon, S.N.*, G.K. Evanylo, R.O. Maguire, and J.M. Goatley, Jr. 2011. Soil nutrient and fescue (*Festuca* spp.) responses to compost and hydroseed on a disturbed roadside. Compost Science and Utilization 19:147-151.

Kostyanovskiy, K.*, G.K. Evanylo, K.K Lasley*, W.L. Daniels, and C. Shang. 2011. Leaching potential and forms of phosphorus in deep row applied biosolids underlying hybrid poplar. Ecological Engineering 37:1765-1771.

Kostyanovskiy, K.I.*, G.K. Evanylo, K.K. Lasley*, C. Shang, B.F. Sukkariyah, and W.L. Daniels. 2011. Transformations of nitrogen and carbon in entrenched biosolids at a reclaimed mineral sands mine. Journal of Environmental Quality 40: 67-75.

Lasley, K.L.*, G.K. Evanylo, K.I. Kostyanovsky*, C. Shang, M. Eick, and W.L. Daniels. 2010. Chemistry and Transport of Metals from Entrenched Biosolids at a Reclaimed Mineral Sands Mining Site. J. Environ. Qual. 39: 1467-1477.

*Graduate student

Selected extension publications since 2006:

Evanylo, G.K. and J. M. Goatley, Jr. 2011. Chapter 9. Organic and inorganic soil amendments. Pp. 9.1–9.16. In Urban Nutrient Management Handbook. VCE Publ. No. 430-350. http://pubs.ext.vt.edu/430/430-350/430-350.html.

Haering, Kathryn C. and Gregory K. Evanylo. 2006. Mid-Atlantic Nutrient Management Handbook. CSREES Mid-Atlantic Regional Water Program. MAWQP 05. 252 p. http://www.mawaterquality.org/capacity_building/ma_nutrient_mgmt_handbook.html.

Jason Papacosma
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Education

M.S., 1998, University of Maryland, College Park, MD
Environmental Science

B.A., 1992, Bowdoin College, Brunswick, ME
Environmental Studies/History Major, Biology Minor

Work Experience

Watershed Programs Manager, Arlington County Department of Environmental Services
2010 – Present

Watershed Planner, Arlington County Department of Environmental Services, September 1999 – 2010

- Provide leadership and vision to create an effective, regulatory compliant, and sustainable Watershed Management Program.
- Manage and coordinate the work of a team of water resources professionals that develops and implements watershed management policies, programs, and projects; manages Arlington County's MS4 permit; develops and oversees development-related stormwater regulations; performs stream assessments, water quality monitoring, and stormwater facility inspections; reviews development plans for stormwater management compliance; and works with citizens on a variety of watershed issues.
- Work closely and collaboratively with staff throughout the organization dealing with various aspects of the watershed management program, including timely and effective implementation of watershed management capital projects included in the County's Capital Improvements Program (CIP).
- Engage the community at all levels about watershed management, including homeowners, community representatives, business owners, environmentalists, as well as elected officials and the County Manager's Office, in an effort to inform and build consensus and support for projects that address the community's essential watershed management needs.

Environmental Project Manager, Marasco Newton Group Ltd.
October 1997 – August 1999

Provided project management and technical analysis for a wide variety of environmental program areas for US EPA client, including Brownfields program, Superfund Hazard Ranking System, environmental risk assessment, and Clean Water Act impaired waters/TMDL programs. Managed work of several junior staff.

Water Quality Monitoring Specialist, Fairfax County Park Authority
September 1996 – September 1997

Designed and implemented stormwater quality monitoring program at Huntley Meadows Park during graduate program work at University of Maryland. Developed monitoring protocols, collected samples, and analyzed data.

Research Analyst, Investor Responsibility Research Center
January 1993 – August 1997

Researched and analyzed environmental performance of S&P 500 companies to produce annual directory for institutional investment clients. Gathered, analyzed, and summarized environmental performance and compliance data from federal, state, and corporate sources. Wrote detailed reports analyzing shareholder resolutions during shareholder voting season.

Staff Assistant, Synthetic Organic Chemical Manufacturers Association
July 1992 – December 1992

Supported project manager for chemical trade association's 'Responsible Care' initiative – a pollution prevention and lifecycle environmental stewardship program. Developed educational and public outreach materials for trade association members. Communicated directly with members. Coordinated annual member conference.

Presentations/Committees/Awards

- Chesapeake Water Environment Association Stormwater Seminar, 2011
- American Council of Engineering Companies Bay TMDL Symposium, 2012/2015
- Chesapeake Stormwater Partners Retreat, 2011/2012/2013
- Center for Watershed Protection Conference, 2012
- Council of Governments Green Streets Symposium, 2013
- Virginia Water Environment Association Stormwater Seminar, 2013/2014

- COG Water Resources Technical Committee, Vice Chair
- Chesapeake Bay Program, Urban Stormwater Workgroup, Stormwater Retrofits Expert Panel

- Center for Watershed Protection Community Watershed Achievement Award, 2012
- Chesapeake Stormwater Network Stoneroller Award, 2014

North Carolina State University
2-Page Resume

NAME: Ryan J. Winston, P.E.
CURRENT POSITION: Doctoral Student
DEPARTMENT: Biological and Agricultural Engineering

EDUCATIONAL QUALIFICATIONS

Expected 2015, North Carolina State University, Raleigh, NC, PhD Biological and Agricultural Engineering
2009, North Carolina State University, Raleigh, NC, M.S. Biological and Agricultural Engineering
2007, University of Florida, Gainesville, FL, B.S. Agricultural and Biological Engineering

PREVIOUS APPOINTMENTS

2009-2014, North Carolina State University, Extension Associate,
Department of Biological and Agricultural Engineering
2006-2007, Water Resources Intern Engineer, HSW Engineering, DeLand, FL

PROFESSIONAL LICENSURE

2013, Professional Engineer, Ohio
2012, Professional Engineer, North Carolina – Civil Engineering/Water Resources
2007, Engineer Intern, Florida

RESEARCH PUBLICATIONS

Representative Refereed Journal Publications (of 25 published, in press, or submitted).

2015 Cizek, A.R., Hunt, W.F., **Winston, R.J.**, and Lauffer, M.S. "Hydrologic performance of regenerative stormwater conveyance (RSC) in the North Carolina coastal plain." *Journal of Environmental Engineering*. In Review.

2015 Page, J.L., **Winston, R.J.**, and Hunt, W.F. "Retrofitting urban street trees for stormwater management with the Silva Cell suspended pavement system." *Ecological Engineering*. In Review.

2015 Page, J.L., **Winston, R.J.**, Mayes, D.B., Perrin, C., and Hunt, W.F. "Hydrologic mitigation of impervious cover in the municipal right-of-way through innovative stormwater control measures." *Journal of Hydrology*. Accepted.

2015 Page, J.L., **Winston, R.J.**, Mayes, D.B., Perrin, C., and Hunt, W.F. "Retrofitting residential streets with stormwater control measures for water quality improvement at the catchment-scale." *Journal of Environmental Engineering*. 141(4), 04014076.

2015 Wilson, C.E., Hunt, W.F., **Winston, R.J.**, and Smith, P. "A comparison of runoff quality and quantity from a commercial low impact development and a conventional development in Raleigh, NC." *Journal of Environmental Engineering*. 141(2), 05014005.

2013 Knight, E.M.P., Hunt, W.F., and **Winston, R.J.** "Side by side evaluation of four level spreader – vegetated filter strips and a swale in eastern North Carolina." *Journal of Soil and Water Conservation*. 68(1), 60-72.

2012 **Winston, R.J.**, Hunt, W.F., Kennedy, S.G., Wright, J.D., and Lauffer, M.S. "Field evaluation of stormwater control measures for treatment of highway runoff in North Carolina." *Journal of Environmental Engineering*. 138(1), 101-111.

2011 Luell, S.K., Hunt, W.F., and **Winston, R.J.** "Evaluation of undersized bioretention stormwater control measures for treatment of highway bridge deck runoff." *Water, Science, and Technology*. 64(4), 974-979.

2011 **Winston**, **R.J.**, Hunt, W.F., Osmond, D.L., Lord, W.G., Woodward, M.D. "Field evaluation of four level spreader – vegetative filter strips to improve urban stormwater quality." *Journal of Irrigation and Drainage Engineering.* 137(3), 170-182.

Technical Reports:

2015 **Winston, R.J.**, and Hunt, W.F. *Monitoring the Performance of Bioretention and Permeable Pavement Stormwater Controls in Northern Ohio: Hydrology, Water Quality, and Maintenance Needs*. Prepared for: NOAA and the University of New Hampshire. In preparation.

2015 **Winston, R.J.**, Smolek, A.P., and Hunt, W.F. *Modeling Bioretention and Permeable Pavement Hydrology in Northern Ohio: Application of DRAINMOD in Current and Future Climate Scenarios*. Prepared for: NOAA and the University of New Hampshire. In preparation.

Stormwater Fact Sheets and White Papers:

2014 Brown, W., Brennan, A.H., **Winston, R.J.**, Dorsey, J.D., Elmer, H., Davidson-Bennett, K., Lopez, F., Hohman, B.M., and Dymond, C. *Innovative Stormwater Solutions for Ohio: Case Studies of LID Implementation and Performance.* National Oceanic and Atmospheric

2010 **R.J. Winston**, W.F. Hunt, W.G. Lord, and A.C. Lucas. *Level Spreader Update: Design, Construction, and Maintenance.* NCSU Agricultural Extension

2010 **R.J. Winston** and W.F. Hunt. *Level Spreader Update: Performance and Research.* NCSU Agricultural Extension

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HONORS / PROFESSIONAL SOCIETIES / SERVICE / OTHER ACTIVITIES

Keynote: Stormwater BMP and Erosion Control Workshop – Griffin, GA (2014)
Keynote: Oldcastle Stormwater Solutions Green Infrastructure Workshop – Atlanta, GA (2014)
Keynote: American Public Works Association (NC section) – Asheville, NC (2012)
Stoneroller Award (2014): Chesapeake Bay Foundation
Member: American Society of Agricultural and Biological Engineers (ASABE), American Society of Civil Engineers (ASCE) and Environment and Water Resources Institute (EWRI), International Water Association (IWA), Water Environment Federation (WEF), Engineers without Borders (EWB)
Committees: Co-chair: ASCE filter strip and bioswale technical committee
Member: ASABE ecological engineering technical committee, ASCE low impact development technical committee, ASCE/EWRI urban water resources research council, Chesapeake Bay filter strip and stream corridor restoration committee, Chesapeake Bay floating treatment wetlands committee
Collaboration: Research and extension involvement with experts at North Carolina State University, University of Tennessee, Oak Ridge National Laboratory, US EPA, North Carolina A&T State University, Texas A&M University, Clemson University, University of Texas-Austin, and Auburn University.

WORKSHOPS

2009-2014: Co-taught 68 stormwater-related workshops to over 2600 professionals in North Carolina, South Carolina, Georgia, Alabama, Texas, Minnesota, Ohio, Michigan, Kentucky, Washington, D.C., Nanjing, China, and Singapore. These workshops resulted in a total of over 26,000 contact hours.

STORMWATER REGULATIONS UPDATES AND EXPERT PANELS

- Based on my research while at NCSU, both the permeable pavement and level spreader – vegetative filter strip chapter of the North Carolina stormwater BMP manual were extensively updated. Aided NCDENR in revisions.
- In conjunction with Kestrel Design Group, re-wrote the bioretention and street tree chapters of the Minnesota stormwater manual.
- Served on the Chesapeake Bay Expert Panel that provided recommendations for crediting urban filter strips and stream buffer upgrades (2013-2014).
- Currently serving on the Chesapeake Bay Expert Panel on floating treatment wetlands (2014-present).

BIOGRAPHICAL SKETCH

Steven L. Stewart
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Department of Environmental Protection and Resource Management
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Towson, Maryland 21204
Phone #: 410-887-7678 ext. 240 Fax #: 410-887-4804

Education

Institution and Location	Degree	Year	Field of Study
Bowling Green State University - Bowling Green, Ohio	B.S.	1973	Biology
Bowling Green State University - Bowling Green, Ohio	M.S.	1978	Biology, Ecology
State University of New York - Stony Brook, NY	Ph.D. - ABD	1988	Ecology

Professional Experience

1990-present **Natural Resource Specialist/Natural Resource Manager** **Baltimore County DEPRM**

- Currently, Chief of the Watershed Management and Monitoring Section.
- Coordinated the NPDES - Municipal Stormwater Discharge Permit two year application process.
- Coordinate the NPDES - Municipal Stormwater Discharge Permits requirements, including annual reporting, watershed management plan preparation and the monitoring program.
- Baltimore County TMDL Coordinator
- Baltimore County representative:
  - Mason/Dixon Taskforce
  - Upper Western Shore Trib Team
  - CBP Urban Stormwater Workgroup
  - CBP Land Use Workgroup
  - Reservoir Technical Workgroup
- CBP Expert Panel Representative (for determining pollutant removal credits) on:
  - Stream Restoration
  - Stormwater Retrofits
  - Shoreline Erosion Control
  - Vegetative Filter Strips
  - Street Sweeping
- Serve as project manager or co-principal investigator for a number grants:
  - Greenways I: Developed a GIS methodology for the identification of priority areas for forest preservation and restoration,
  - Greenways II: Refinement of the methodology developed in Greenways I and application of the Level II analysis to all the subwatersheds in Baltimore County,
  - Gunpowder River Watershed Study: Managed the monitoring, stream stability and risk assessment portions of the study, wrote the final monitoring report and risk assessment report (in preparation),
  - Water Environment Research Federation (WERF) grant to study the functions and effectiveness of riparian buffers in an urban setting: project manager, production of final document.
  - Street Sweeping Pollutant Removal Efficiency
- Contract Management:
  - On-call services for Small Watershed Action Plan Development
  - USGS Cooperative Agreement for operation of stream gages

- Reviewed development plans for compliance with environmental regulations for the protection of streams, wetlands, floodplains and forest.

1986-1988 Research Assistant - full time SUNY - Stony Brook
Developed research designs for investigations of population and community dynamics in intertidal mudflat invertebrate communities. Implemented the research designs for field and laboratory experiments; statistically analyzed the data, prepared graphs, conducted background literature research and co-authored papers for publication.

1986 (Spring) Adjunct Assistant Professor University of Long Inland
Taught a sophomore level course in field ecology and a senior level course in evolution for a professor on sabbatical.

1978-1986 Graduate Teaching and Research Assistant SUNY - Stony Brook
As a graduate, alternated between teaching entry level biology and invertebrate biology laboratories, and conducting research on species interactions in intertidal mudflat communities.

1980-1984 Biological Aide NOAA - Stony Brook
Conducted literature searches and reviews for NOAA publications. Prepared portions of testimony on PCBs for presentation to Congress. Edited and commented on papers submitted for symposium publication. Prepared summary tables and graphs.

Publications

2011	Lead in the preparation of the Baltimore County Phase II WIP to meet Chesapeake Bay TMDL reduction requirements for Baltimore County stormwater and septic system allocations.
1997-2014	NPDES Annual Report with other EPS staff
2008	Deriving Reliable Pollutant Removal Rates for Municipal Street Sweeping and Storm Drain Cleanout Programs in the Chesapeake Bay Basin. Contributed to publication
2005	S. Stewart, E. Gemmill, and N. Pentz. An Evaluation of the Functions and Effectiveness of Urban Riparian Forest Buffers. WERF Project 99-WSM-4.
2001	Gunpowder Watershed Study – Final Monitoring Report
1998	An Analysis of the Environmental Effects of Road Maintenance Activities
1997	Refinements of Level I and Level II of the Greenway Corridor Identification Methodology
1997	Manual of Practice for Detection and Removal of Illicit Connections with Steve Adamski
1996	A GIS-based Methodology for Establishing a Greenway Corridor System in a Fragmented Forest Landscape with Pat Cornman and Rich Pfingston
1985	Levinton, J..S., S. Stewart and T.H. Dewitt. Field and laboratory experiments on interference between *Hydrobia totteni* and *Ilyanassa obsoleta* (Gastropoda) and its possible relation to seasonal shifts in vertical mudfalt zonation. Mar. Ecol. Prog. Ser. 22:53-58
1984	Levinton, J.S., T.S. Bianchi and S. Stewart. What is the role of particulate organic matter in benthic invertebrate nutrition? Bull. Mar. Sci. 35:270-282.
1982	Levinton, J. S. and S. Stewart. Marine succession: Effect of two deposit-feeding gastropod species on the population growth of *Paranais litoralis*. J. Exp. Mar. Biol. Ecol. 59:321-241.
1980	Stewart, S. and K. Schurr. Effects of asbestos on survival of *Artemia*. In: The Brine Shrimp *Artemia*: Morphology, Genetics, Radiobiology, Toxicology.

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Professional Preparation

University of Florida, Environmental Engineering, BS, 1981
University of Florida, Environmental Engineering (Water Resources), M.E., 1984
University of Colorado, Civil Engineering (Water Resources), Ph.D., 2003

Academic Appointments

2008-present	Assistant Professor, Virginia Tech, Department of Biological Systems Engineering

Professional (Nonacademic) Appointments

2005-2008	Principal Engineer and Practice Leader, Water Resources, Brown and Caldwell, Atlanta, GA.
2004-2005	Senior Water Resources Engineer, MACTEC Engineering and Consulting, Kennesaw, GA.
2003-2004	Senior Water Resource Engineer, ENTRIX Environmental, Atlanta, GA.
2000-2003	Senior Water Resource Engineer, LAW Engineering, Kennesaw, GA.
1995-1997	District Engineer, Left Hand Water District, Longmont, CO.
1989-1993	City Engineer, City of Gainesville, Gainesville, GA.
1988-1989	County Engineer, Columbia County, Evans, GA.
1987-1988	Assistant County Engineer, Richmond County, Augusta, GA.
1986-1987	Environmental Engineer, GZA Environmental, Newton, MA.
1984-1986	Environmental Engineer, US EPA Region 4, Atlanta, GA.
1983-1984	Project Engineer, Taulmann Corporation, Atlanta, GA.
1982-1983	Water Resource Engineer, South Florida Water Management District, West Palm Beach, FL.

Publications

Peer-reviewed Journal Publications:

Lucas, W. C., and Sample, D. J., 2014. Reducing combined sewer overflows by using outlet controls for green stormwater infrastructure: case study in Richmond, Virginia. *J. Hydrol.* doi:10.1016/j.jhydrol.2014.10.029.

Sample, D., Rangarajan, S., Boone, M., Lee, J., and Manguerra, H., 2014. Urban wet-weather flows, *Water Environ. Res.*, 86, pp. 910-991. doi: 10.2175/106143014X14031280667372.

Wang, C.-Y., Sample, D. and Bell, C., 2014. Assessment of nutrient removal through vegetation harvest of floating treatment wetlands in urban stormwater ponds, *Sci. of the Total Env.* doi: 10.1016/j.scitotenv.2014.08.063.

Wang, C.-Y., Sample, D.J., Day, S.D., and Grizzard, T.J., 2014. Floating treatment wetland nutrient removal through vegetation harvest and observations from a field study, *Ecol. Eng.* doi: 10.1016/j.ecoleng.2014.05.018.

Liu, J. Sample, D., Owen, J., Li, J., and Evanylo, G.E., 2014. Assessment of selected bioretention media blends for nutrient retention using mesocosm experiments, *J. Environ. Qual.* doi:10.2134/jeq2014.01.0017.

Sample, D. and Liu, J., 2014. Optimizing rainwater harvesting systems for the dual purposes of water supply and runoff capture. *J. Clean. Prod.*, 75 (0), pp. 174-194. doi: http://dx.doi.org/10.1016/j.jclepro.2014.03.075.

Liu, J., Sample, D.J., Bell, C., and Guan, Y., 2014. Review and research needs of bioretention used for the treatment of urban stormwater, *Water*, 6 (4), pp. 1069-1099, doi:10.3390/w6041069.

Wang, C.-Y. and Sample, D., 2014. Assessment of the nutrient removal effectiveness of floating treatment wetlands applied to urban retention ponds, *J. Environ. Manage.*, pp. 1-13, doi: http://dx.doi.org/10.1016/j.jenvman.2014.02.008.

Sample, D., Lucas, W.L., Janeski, T., Roseen, R.M., Powers, D., Freeborn, J., and Fox, L.J., 2014. Greening Richmond, USA: a sustainable urban drainage demonstration project, *P. I. Civil Eng.*, 167 (2), pp. 88–95, doi: http://dx.doi.org/10.1680/cien.13.00036.

Wang, C.-Y., and Sample, D., 2013. Assessing floating treatment wetlands nutrient removal performance through a first order kinetic model and statistical inference, *Ecol. Eng.*, 61, Part A (0), pp. 292-302. doi: http://dx.doi.org/10.1016/j.ecoleng.2013.09.019.

Sample, D., Grizzard, T., Sansalone, J., Davis, A.P., Roseen, R. and Walker, J., 2012. Assessing the performance of manufactured treatment practices for removing phosphorus from urban stormwater, *J. Environ. Manage.*, 113, pp. 279-291, doi: 10.1016/j.jenvman.2012.08.039.

Liu, J., Sample, D., and Zhang, H., 2013. Frequency analysis for precipitation events and dry durations of Virginia, *Environ. Model. Assess.*, 1-12. doi:10.1007/s10666-013-9390-2.

Sample, D., Liu, J., and Wang, S., 2013. Evaluating the dual benefits of rainwater harvesting systems using reliability analysis, *J. Hydrol. Eng.*, 18 (10), pp. 1310-1321. doi:10.1061/(ASCE)HE.1943-5584.0000748.

Sample, D. and Powers, D., 2012. An analytical method for evaluating pumps for a storage-pump system, *Appl. Eng. Agric.*, 28(4): 559-565, doi: 10.13031/2013.42085.

Rangarajan, S., Sample, D.J., Boone, M., Lee, J., Muneer, A., Narayanaswamy, K., Hochstedler, M., 2012. Urban wet-weather flows, *Water Environ. Res.*, 84 (10), pp. 861-970. doi: 10.2175/106143012X13407275694608.

Peer-reviewed Extension publications:

Sample, D., Fox, L.J., and Wang, C.-Y.*, 2013. Innovative Best Management Fact Sheet No. 1: Floating Treatment Wetlands, Virginia Cooperative Extension, 5 pp. BSE-76P, http://pubs.ext.vt.edu/BSE/BSE-76/BSE-76.html.

Sample, D. et al., 2011-2012. Stormwater Best Management Practice Fact Sheet Series (16 publications), VCE found at: http://pubs.ext.vt.edu/author/s/sample_david_j-res.html.

Goatley, J., (Ed.) W. Daniels, Evanylo, G., Fox, L., Haering, K., Hodges, S., Maguire, R., Sample, D., Hansen, D., Kindig, D., Sexton, T. Habel, R., Hensler, K., 2011. Urban Nutrient Management Handbook, Publication 430-350. Virginia Cooperative Extension. 200 pp., http://pubs.ext.vt.edu/430/430-350/420-350_sml_pdf.

Dr. Franco A. Montalto P.E.

Professional Preparation:

- The Cooper Union for the Advancement of Science and Art, BS, Civil Eng., 1995.
- Cornell University, Environmental Engineering, M.S., 2002; Ph.D., 2003.
- Columbia University, Earth Institute, Postdoctorate Research Fellow, 2005-07
- Licensed Professional Engineer in Pennsylvania, and New York

Appointments:

- Drexel University, Department of Civil, Architectural, & Environmental Engineering
  Associate Professor, 9/13 - present
  Assistant Professor, 9/07 – 8/13
  Director, Sustainable Water Resource Engineering Lab, 9/07 - present
- IUAV University (Venice, Italy), Erasmus Mundus Master Course in Maritime Spatial Planning
  Scholar, 2/15-4/15
- New York City Urban Field Station
  Visiting Scholar, 5/14 – 10/15
- Columbia University
  Adjunct Assistant Research Scientist, 9/07-12/08
- Universita' di Architettura di Venezia, Laboratory for Locally Sustainable Development, 1997 Researcher.
- eDesign Dynamics LLC
  Founder and President of NYC-based environmental consulting firm specializing in planning, modeling, and design of green infrastructure and natural areas restoration projects

Products:

Most Closely Related to Proposed Project:

Alfredo, K; **Montalto, FA**; & A. Goldstein (2010) Observed and Modeled Performance of Prototype Green Roof Test Plots Subjected to Simulated Low and High Intensity Precipitation in a Laboratory Experiment. Journal of Hydrologic Engineering. Vol. 15. Issue 6. 444-457.

Basinger, M; **Montalto, FA**; and U Lall (2010) A Rainwater Harvesting System Reliability Model Based on Nonparametric Stochastic Rainfall Generator. Journal of Hydrology. 392. 105-118.

Montalto, FA; Bartrand, TA; Waldman, AM; Travaline, K; Loomis, C; McAfee, C; Geldi, J and G. Riggal. (2012) Decentralized Green Infrastructure: The Importance of Stakeholder Behavior in Determining Spatial and Temporal Outcomes. Journal of Structure and Infrastructure Engineering. 1-19.

Spatari, S; Yu, Z and **FA Montalto** (2011) Life Cycle Implications of Urban Green Infrastructure Development. Environmental Pollution. 159 (8-9) 2174-2179.

Catalano de Sousa, M; **Montalto, FA**; and S Spatari. (2012) Using Life Cycle Assessment to Evaluate Green and Grey Combined Sewer Overflow Control Strategies. Journal of Industrial Ecology. 16 (6) 901–913.

Five Other Products:

DiGiovanni, K; Gaffin, S; **Montalto, FA** and C Rosenzweig (2013) The Applicability of Classical Predictive Equations for the Estimation of Evapotranspiration from Urban Green Spaces: Green Roof Results. Journal of Hydrologic Engineering 18(1). 99-107.

Montalto, FA and T Steenhuis (2004). The Link between Hydrology and Restoration of Tidal Marshes in the NY/NJ Estuary. Wetlands. Vol. 24, No. 2 pp. 414-425.

Montalto, FA, T. S. Steenhuis, and J.-Y. Parlange (2006) The hydrology of Piermont Marsh, a reference for tidal marsh restoration in the NY Estuary, Journal of Hydrology., 316 (1-4) 108-128.

Montalto, FA; Parlange, J-Yves; and TS Steenhuis, (2007). A Simple Model of For Predicting Water Table Fluctuations in a Tidal Marsh. Water Resources Research. 43, W03439, doi:10.1029/2004WR003913.

Montalto, FA; Behr, CT; Alfredo, K; Wolf, M; Arye, M; and M. Walsh (2007) A Rapid Assessment of the Cost Effectiveness of Low Impact Development for Control of Combined Sewer Overflows Landscape and Urban Planning 82: pp. 117-131.

Past and Present Synergistic Activities:

Co-Chair: ASCE-EWRI Technical Committee on Low Impact Development Computational Methods

Committee Member: ASCE-EWRI Technical Committee Investigating Low Impact Development as a Means of Reducing Combined Sewer Overflows

Committee Member: CUAHSI Standing Committee on Observations

Professional Member: Water Environment Federation; American Society of Civil Engineers; American Geophysical Union

Collaborators

Drexel Collaborators: A. Emin Aktan, Patrick Gurian, Christian Hunold, Franklin Moon, Mira Stone Olson, Anu Pradhan Mimi Sheller, Sabrina Spatari, Romano Foti

Other Academic Collaborators: Joseph Cataldo (Cooper Union); Upmanu Lall, Stuart Gaffin, Cynthia Rosenzweig (Columbia University); Michael Piasecki (CCNY), Jianpang Zhou (Southern Illinois Univ)

Industry Collaborators: Timothy Bartrand (Tetratech), Christopher Behr, (HDR Decision Economics), Eric Rothstein (eDesign Dynamics LLC)

Graduate Advisors and Postdoctoral Sponsors:

Prof. Tammo Steenhuis, Cornell University; Prof. J.-Yves Parlange, Cornell University
Prof. William Goldsmith, Cornell University; Prof. Upmanu Lall, Columbia University, Prof. Patricia Culligan, Columbia University

Thesis Advisor and Postgraduate-Scholar Sponsor

Columbia University: Stacy Radine, MS, graduated 2007, Matthew Basinger, 2008
Drexel University: Kimberly DiGiovanni, Alexander Waldman, Ziwen Yu, Katherine Travaline, Paula Estornell, Nathan Rostad, Maria Raquel Catalano de Sousa; Bita Alizadehtazi, Scott Jeffers, Lauren Smalls-Mantey, Stephanie Miller, Leena Shevade, Romano Foti, Alisha Goldstein, Stephen White, Stuart Burg, Bita Alizadeh, Ajay Sunder, Wei Chen
University of Texas at Austin: Katherine Alfredo