

CURRICULUM VITAE

Calendar Year: 2013

KEITH N. ESHLEMAN

Appalachian Laboratory
University of Maryland Center for Environmental Science

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I. EDUCATION

- 1978 B.A., University of Virginia, Charlottesville (Environmental Sciences)
- 1982 S.M., Massachusetts Institute of Technology, Cambridge (Civil Engineering)
- 1985 Ph.D., Massachusetts Institute of Technology, Cambridge (Water Resources)

II. PROFESSIONAL BACKGROUND

- 1985-1986 Senior Scientist—Environmental Sciences, Northrop Services, Inc., Contractor to U.S. Environmental Protection Agency, Environmental Research Laboratory, Corvallis, OR.
- 1986-1988 Project Scientist—Environmental Sciences, Northrop Services, Inc., Contractor to U.S. E.P.A., Environmental Research Laboratory, Corvallis, OR.
- 1988-1994 Assistant Professor, Department of Environmental Sciences, University of Virginia, Charlottesville, VA.
- 1994-1995 Associate Professor (with tenure), Department of Environmental Sciences, University of Virginia, Charlottesville, VA.
- 1995-2006 Associate Professor, University of Maryland Center for Environmental Science, Appalachian Laboratory, Frostburg, MD.
- 2006- Professor, University of Maryland Center for Environmental Science, Appalachian Laboratory, Frostburg, MD.

III. HONORS AND AWARDS

- 2013 President's Award for Excellence in Application of Science; University of Maryland Center for Environmental Science

IV. RESEARCH

A. Areas of Professional Expertise

Watershed hydrology; wetlands hydrology; groundwater/surface water interactions; biogeochemical processes in upland and wetland ecosystems; acidification of surface waters; hydrochemical modeling and regionalization; ecosystem interactions with land use change

B. Peer-Reviewed Publications

1. Papers in Refereed Journals:

Eshleman, K.N., B.E. McNeil, and P.A. Townsend. 2009. Validation of a remote-sensing based index of forest disturbance using streamwater nitrogen data. *Ecological Indicators*,

- 9:476-484; doi:10.1016/j.ecolind.2008.07.005 (UMCES Scientific Series No. 4200).
- Townsend, P.A., D.P. Helmers, B.E. McNeil, K.M. de Beurs, and K.N. Eshleman. 2009. Changes in the extent of surface mining and reclamation in the Central Appalachians: 1976-2006. *Remote Sensing of Environment* **113**:62-72; doi:10.1016/j.rse.2008.08.012 (UMCES Scientific Series No. 4247).
- Ferrari, J.R., T.R. Lookingbill, B.C. McCormick, P.A. Townsend, and K.N. Eshleman. 2009. Surface mining and reclamation effects on flood response of watersheds in the Central Appalachian Plateau region. *Water Resources Research* **45**, doi:10.1029/2008WR007109 (UMCES Scientific Series No. 4249).
- McCormick, B.C., K.N. Eshleman, J.L. Griffith, and P.A. Townsend. 2009. Detection of flooding responses at the river basin scale enhanced by land use change. *Water Resources Research* **45**, doi:10.1029/2008WR007594 (UMCES Scientific Series No. 4289).
- Lookingbill, T.R., S.S. Kaushal, A.J. Elmore, R.H. Gardner, K.N. Eshleman, R.H. Hilderbrand, R.P. Morgan, W.R. Boynton, M.A. Palmer and W.C. Dennison. 2009. Altered ecological flows blur boundaries in urbanizing watersheds. *Ecology and Society* **14** (2): 10. [online] URL: <http://www.ecologyandsociety.org/vol14/iss2/art10/> (UMCES Scientific Series No. 4307).
- Palmer, M.A., E.S. Bernhardt, W.H. Schlesinger, K.N. Eshleman, E. Foufoula-Georgiou, M.S. Hendryx, A.D. Lemly, G.E. Likens, O.L. Loucks, M.E. Power, P.S. White, and P.R. Wilcock. 2010. Mountaintop mining consequences. *Science (Policy Forum)* **327**:148-149 (UMCES Scientific Series No. 4368).
- Utz, R.M., K.N. Eshleman, and R.H. Hilderbrand. 2011. Variation in hydrological, chemical, and thermal responses to urbanization in streams between two physiographic regions of the mid-Atlantic United States. *Ecological Applications* **21**:402-415 (UMCES Scientific Series No. 4468).
- McCormick, B.C., and K.N. Eshleman. 2011. Assessing hydrologic change in surface-mined watersheds using the curve number method. *ASCE Journal of Hydrologic Engineering* **16**:575-584 (UMCES Scientific Series No. 4465).
- Townsend, P.A., A. Singh, J.R. Foster, N.J. Rehberg, C.C. Kingdon, K.N. Eshleman, and S.W. Seagle. 2012. A general Landsat model to predict canopy defoliation in broadleaf deciduous forests. *Remote Sensing of Environment* **119**:255-265 (UMCES Scientific Series No. 4601).
- Deel, L.N., B.E. McNeil, P.G. Curtis, S.P. Serbin, A. Singh, K.N. Eshleman, and P.A. Townsend. 2012. Relationship of a Landsat cumulative disturbance index to canopy nitrogen and forest structure. *Remote Sensing of Environment* **118**:40-49 (UMCES Scientific Series No. 4603).
- Eshleman, K.N., K.M. Kline, and R.D. Sabo. 2013. Surface water quality is improving due to declining atmospheric N deposition. *Environmental Science and Technology* **47**:12193-12200 (UMCES Scientific Series No. 4816).
- Cowles, T.R., B.E. McNeil, K.N. Eshleman, L.N. Deel, and P.A. Townsend. 2014. Does the spatial arrangement of disturbance within watersheds affect stream water N loading? A test using Landsat and synoptic stream water data. *International Journal of Applied Earth Observation and Geoinformation* (in press).

2. Manuscripts in Review:

Singh, A., K.N. Eshleman, A. Gutierrez-Magness, and P.A. Townsend. Continuous-time modeling of streamwater nutrient loading from forests in the Chesapeake Bay watershed using MODIS and meteorological data. *Environmental Science and Technology*.

3. *Other Scientific Papers:*

Eshleman, K.N., and B.C. McCormick. 2009. Hydrological functioning of surface-mined watersheds in western Maryland: restoration or reclamation? In: *Proceedings of Geomorphic Reclamation and Natural Stream Design at Coal Mine: A Technical Interactive Forum* (K.C. Vories and A.H. Caswell, Eds.), pp. 15-24. U.S. Dept. of Interior, Office of Surface Mining, Alton, IL & Coal Research Center, Southern Illinois University, Carbondale, IL (UMCES Scientific Series No. 4299).

4. *Technical Reports:*

Eshleman, K.N., and P.A. Townsend. 2011. Exacerbation of flooding responses due to land cover/land use change: a comparative study. Final report to NASA (grant no. NNG06GC83G), 35 pp. plus 9 appendices (UMCES Technical Series No. TS-617-11).

National Research Council, Committee on Uranium Mining in Virginia. 2011. *Uranium Mining in Virginia: Scientific, Technical, Environmental, Human Health and Safety, and Regulatory Aspects of Uranium Mining and Processing in Virginia*. The National Academies Press, Washington, DC, 290 pp.

Eshleman, K.N., and A.J. Elmore. 2013. *Recommended best management practices for Marcellus shale gas development in Maryland*. Final report to Maryland Department of the Environment, 172 pp. (UMCES Technical Series No. TS-646-13).

C. Contracts and Grants

1. *Awarded:*

Exacerbation of flooding responses due to land cover/land use change: a comparative study (with P.A. Townsend); NASA LCLUC Program, 2006-2010; \$570,468 (PI, 10% time).

American chestnut planting on a reclaimed strip-mine in western Maryland; American Chestnut Foundation, 2008-2010; \$25,000 (PI, 5% time).

Characterization of forest functional types and their role in mediating ecosystem response to environmental change (with P. Townsend, PI, and B. McNeil); NASA Terrestrial Ecology (subcontract from Univ. of Wisconsin—Madison), 2008-2011; \$135,906 (co-PI, 5% time).

Improving BASINS/HSPF predictions of nitrogen export to improve TMDL accuracy using NASA imagery (with P. Townsend, PI, *et al.*); NASA Decision Support Systems, 2009-2014; \$888,178 (co-PI, 10% time).

2009 Gordon Conference on Catchment Science: Interactions of Hydrology, Biology, and Geochemistry; NSF Hydrologic Sciences, 2009-2010; \$30,750 (PI, 0% time).

MRI-R2: Acquisition of a shared stable isotope ratio mass spectrometer for ecological, geological & hydrological research, education & training in the central Appalachians (with D. Nelson, PI, *et al.*); NSF DBI/DEB, 2009-2011; \$625,882 (co-PI, 0% time).

Best management practices for Marcellus shale gas exploration and production; Maryland Department of Environment; 2012-2013; \$138,950 (PI, 30% time).

Forest N retention in the Chesapeake Bay watershed: a role in water quality restoration (Robert Sabo summer fellowship)? Maryland Water Resources Research Center; 2012; \$6,000 (PI, 0% time).

Forest N retention in the Chesapeake Bay watershed: a role in water quality restoration? (Robert Sabo, USEPA STAR graduate fellowship); USEPA NCER STAR Graduate Fellowships Program; 2012-2015 (Grad. Advisor, 0% time).

Targeting effective forest BMPs in Potomac watersheds (w/ A. Elmore); National Fish and Wildlife Foundation (subcontract from MDNR); 2013-2015; \$164,789 (PI, 15% time).

Assessment of bioswale performance (w/ R.P. Morgan II, PI); Maryland Dept. of Transportation, State Highway Administration; 2013-14; \$248,136 (co-PI, 8% time).

2. Pending:

None

D. Invited Seminars and Presentations

Eshleman, K.N. 2010. *Environmental impacts of surface mining in the Central Appalachian region*. Millersville University Science and Technology Policy Conference, March 26, Millersville, PA.

Eshleman, K.N. 2011. *The Western Maryland floods of March '36 and January '96: a hydrologist's perspective*. St. Patrick's Day 1936 Flood Symposium, Allegany Museum, March 19, Cumberland, MD.

Eshleman, K.N. 2011. *Detecting, quantifying, and understanding water quality changes in Appalachian watersheds*. Stroud Water Research Center, November 15, Avondale, PA.

E. Invited and Contributed Papers for Professional Meetings

Eshleman, K.N., and B.C. McCormick. 2009 (**Invited**). Hydrological functioning of surface-mined watersheds in western Maryland: restoration or reclamation? OSM Technical Forum on Geomorphic Reclamation and Natural Stream Design at Coal Mines, Bristol, VA.

Utz, R.M., K.N. Eshleman, and R.H. Hilderbrand. 2009. Variations in hydrological, chemical, and thermal responses to urbanization in streams between two physiographic regions of the southeastern United States. American Fisheries Society Annual Meeting, Nashville, TN.

Lookingbill, T.R., J.R. Ferrari, K.N. Eshleman, and P.A. Townsend. 2010. Landscape modeling of hydrological response to surface mining and reclamation. Association of American Geographers 2010 Annual Meeting, Washington, DC.

Eshleman, K.N., B.E. McNeil, and P.A. Townsend. 2010. Validation of a remote-sensing based index of forest disturbance using streamwater nitrogen data. NASA Terrestrial Ecology Science Team Meeting, La Jolla, CA (poster).

Eshleman, K.N. 2010 (**Invited**). LCLUC in NEESPI: interactions with climate and hydrology. NASA Land Cover/Land Use Change Science Team Meeting, Bethesda, MD.

Eshleman, K.N., W.S. Currie, J.A. Simmons, K.M. Kline, and W.H. Schlesinger. 2010 (**Invited**). Alteration of ecosystem services by surface mining and reclamation in Appalachian Mountain watersheds. Ecological Society of America Annual Meeting, Pittsburgh, PA.

Ferrari, J., and K.N. Eshleman. 2010 (**Invited**). Surface mining effects on hydrology. Ecological Society of America Annual Meeting, Pittsburgh, PA.

Townsend, P.A., S. Jin, C.C. Kingdon, and K.N. Eshleman. 2010 (**Invited**). Patterns of surface mining in the central Appalachians. Ecological Society of America Annual Meeting, Pittsburgh, PA.

- Paris, R.L., B.C. McCarthy, C.D. Barton, J.A. Franklin, J.G. Skousen, M. Jacobson, and K.N. Eshleman. 2010. American chestnut restoration on surface mined sites in the Appalachian region. Ecological Society of America Annual Meeting, Pittsburgh, PA.
- Eshleman, K.N., K.M. Kline, B.E. McNeil, and P.A. Townsend. 2010. Climatic variations and ecosystem disturbances as drivers of water quality changes in forested ecosystems. *Eos, Trans. Amer. Geophys. Union*, AGU Fall Meeting, San Francisco, CA.
- Eshleman, K.N., K.M. Kline, and R.D. Sabo. 2011. Trends in surface-water nitrate-N concentrations and loads from predominantly-forested subwatersheds of the Chesapeake Bay basin. Maryland Water Monitoring Council 17th Annual Conference, Linthicum, MD.
- Eshleman, K.N., K.M. Kline, and R.D. Sabo. 2011. Trends in surface-water nitrate-N concentrations and loads from predominantly-forested subwatersheds of the Chesapeake Bay basin. *Eos, Trans. Amer. Geophys. Union*, AGU Fall Meeting, San Francisco, CA (poster).
- Eshleman, K.N., R.D. Sabo, and K.M. Kline. 2012 (**Invited**). Trends in surface-water nitrate-N concentrations and loads from predominantly-forested subwatersheds of the Chesapeake Bay basin. Chesapeake Bay Program Science and Technology Advisory Committee (STAC) workshop on *Beneficial Effects of Healthy Watersheds on Pollutant Fate and Transport*, Buckeystown, MD.
- Eshleman, K.N., A.J. Elmore, and R.D. Sabo. 2012 (**Invited**). Marcellus shale gas development: best management practices for Maryland. Workshop on *Water Resources Monitoring and Marcellus Shale Gas Development in Western Maryland: What Do We Have, What Do We Need?* Maryland Water Monitoring Council, Garrett College, McHenry, MD.
- Eshleman, K.N., and A.J. Elmore. 2013. (**Invited**). Marcellus shale gas development: recommended best management practices for Maryland. Western Maryland RC&D Quarterly Meeting, March 27, Allegany College of Maryland, Cumberland, MD.
- Eshleman, K.N., and A.J. Elmore. 2013. (**Invited**). Marcellus shale gas development: recommended best management practices for Maryland. 2013 Maryland Land Conservation Conference, April 23, Maryland Maritime Institute, Linthicum, MD.
- Eshleman, K.N., and A.J. Elmore. 2013. (**Invited**). Marcellus shale gas development: recommended best management practices for Maryland. Leadership Allegany, May 8, Frostburg State University, Frostburg, MD.

F. Conferences Organized/Chaired for Professional Meetings

- 2009 Gordon Research Conference on *Catchment Science: Interactions of Hydrology, Biology, and Geochemistry*, July 12-17, Andover, NH (elected conference co-chair and co-organizer)
- 2015 *Acid Rain 2015: Successes Achieved and Challenges Ahead*, October 19-23, Rochester, NY (invited scientific program committee member)

G. Activity in Professional Societies

- 1986- American Geophysical Union, Hydrology Section (member)

V. TEACHING AND TRAINING

- 1995- Member, Graduate Faculty, Frostburg State University
- 1995- Member, Graduate Faculty in Marine-Estuarine-Environmental Science, University System of Maryland
- 1998- Member, University System of Maryland Inter-Institutional Graduate Faculty

A. University System of Maryland Courses Taught

Course No.	Course Title	Institution	Semester	Enrollment	Credit hrs.	Co-instructors	No. of Lectures
MEES 6980/BIOL-650-002	Hydrological Effects of Land Use Change	UMCP/FSU	Spring '10	13	3		26
			Spring '12	9	3		26

B. Graduate Students Supervised as Major Advisor

1. Degrees Completed:

None

2. Degrees in Progress:

Sabo, Robert; M.S., MEES, University of Maryland College Park; Thesis: *Response of a nitrogen-saturated forested catchment to declining atmospheric nitrogen deposition*; degree expected May 2014.

Hood, Claire, M.S., CONS, University of Maryland College Park; Scholarly paper: *Best management practices and environmental effects of oil and gas development on U.S. wildlife refuges*; degree expected May 2014.

C. Graduate Student Committee Memberships

1. Degrees Completed:

Craig, Laura, Ph.D., BEES, University of Maryland College Park; Thesis: *Nitrogen saturation in streams and forests of the Maryland Piedmont*; December 2009.

Utz, Ryan, Ph.D., MEES, University of Maryland College Park; Thesis: *Interregional differences in stream ecosystem responses to urbanization: causes and consequences*; December 2009.

Cowles, Travis, M.S., Geography, West Virginia University; Thesis: *Does the spatial pattern of disturbance within watersheds affect stream water N loading? A test using the Landsat disturbance index, and five years of synoptic stream water sampling*; August 2011.

Bhaskar, Aditi, Ph.D., Chemical, Biochemical, and Environmental Engineering, University of Maryland Baltimore County. Thesis: *Effects of urbanization on groundwater flow systems and streamflow generation*; December 2013.

2. Degrees in Progress:

Gardner, John, M.S.; MEES, University of Maryland College Park; Thesis: *Export of N₂, N₂O, and nutrients from watersheds in the Choptank River basin*; degree expected May 2014.

Lundberg, Dot, Ph.D., MEES, University of Maryland College Park; Thesis: *The effects of ditching on the hydrological regime and ecosystem services of coastal marshes*; degree expected May 2014.

Vest, Kim, Ph.D., MEES, University of Maryland College Park; Thesis: *TBA*; degree expected May 2014.

Coulter, Caroline, M.S., MEES, University of Maryland College Park; Thesis: *TBA*; degree expected May 2015.

VI. SERVICE

A. Public Service

- 2007-2013 Ridge and Valley Streamkeepers, Maryland, Pennsylvania (elected board member)
2013-2015 Savage River Watershed Association, Maryland (elected board member)

B. Federal/State/Local Governments

- 2010 NASA Interdisciplinary Science panel review, January 5-7, Washington, DC (invited panel reviewer)
2010 National Acid Precipitation Assessment Program (invited reviewer of *2010 NAPAP Report to Congress*)
2010-2011 National Academy of Science, Water Science and Technology Board: NRC study of uranium mining in Virginia (invited committee member)
2011 National Acid Precipitation Assessment Program (invited reviewer of *2011 NAPAP Report to Congress*)
2012-2013 Marcellus Shale Safe Drilling Initiative Advisory Commission (invited participant and presenter at several commission meetings)
2013 NASA Interdisciplinary Science panel review, July 29-31, Washington, DC (invited panel reviewer)

C. International

- 2007-2009 Gordon Research Conference on *Catchment Science: Interactions of Hydrology, Biology & Geochemistry*, July 12-17, 2009, Andover, NH (elected chair and conference co-organizer).

D. Editorships

- 2004-2010 Ecological Society of America: *Ecological Applications* (subject matter editor)

E. USM, UMCES and Laboratory

USM

- 2008-2011 USM Council of University System Faculty (UMCES representative)
2010-2011 USM Board of Regents Faculty Awards Selection Committee (member)
2011 USM Ad-hoc Group on Voluntary Separation Program (member)
2013-2014 USM Curriculum Restructuring Committee for the MEES Graduate Program (member)

UMCES

- 2008-2011 UMCES Faculty Senate (elected chair)
2008-2009 UMCES P&T Committee (member)
2009-2010 UMCES P&T Committees (member)
2010-2011 UMCES P&T Committee (member)
2011 UMCES Director Review Committee (member)
2011-2013 Federal Demonstration Partnership (UMCES faculty representative)
2012-2013 UMCES Post-Tenure Comprehensive Review Committee (member)
2013 UMCES Accreditation Readiness Report (workgroup member)

Laboratory

- 2009-2011 AL Safety Committee (member)

2012-2013 AL Director's Search Committee (member)

F. Other

2008-2010 Allegany College of Maryland, Cumberland, MD (head coach: men's intercollegiate soccer)