

EXHIBIT I

AFFIDAVIT OF MATTHEW E. BAKER

1. My name is Matthew E. Baker. I am over 18 years of age, competent to testify, and have personal knowledge of the facts stated herein.
2. I am Professor of Geography and Environmental Systems and Associate Dean for the College of Arts, Humanities, and Social Sciences at University of Maryland, Baltimore County (UMBC). I have been employed at UMBC since August 1st, 2008. My academic and professional experience is primarily set forth in the attached curriculum vitae. I hold a Ph.D. (Aquatic Ecology) and M.S. (Forest Ecology) in Natural Resources and Environment, both from the University of Michigan, and a B.A. in English from Emory University.
3. I have worked professionally as a quantitative landscape ecologist for more than 20 years, studying the effects of biophysical variation and human activity on ecological processes and biological communities. I have expertise in stream assessment, ecological restoration of streams, wetlands, and woodlands, terrain analysis, watershed hydrology, Geographical Information Systems (GIS) and remote sensing, and ecological statistics.
4. I have taught courses in Graduate Research Methods, Physical Geography, Watershed Science and Management, Forest Ecology, Watershed Analysis & Modeling, Riparian Ecosystems, and Applied Landscape Ecology.
5. I have served as an expert witness in several cases tried in federal court (S.D. W.Va. 2:13-21588; S.D. W.Va. 2:13-5006; S.D. W.Va. 2:15-1371) as well as tax court (146 Tax Court No. Docket 5445-13, Baltimore, MD) and have been deposed for a circuit court case (MD Case No.:16-cv-03698-TDC).
6. I reviewed the following documents in forming my opinions:
 - a. Forest Stand Delineation for Abingdon Business Park, approved by Milton Davenport on August 2, 2019
 - b. Forest Conservation Report for Abingdon Business Park dated February, 2019
 - c. Forest Conservation Plan for Abingdon Business Park, approved by Milton Davenport on December 9, 2019
 - d. Correspondence dated October 7, 2019 from Morris & Ritchie Associates, Inc. to the Harford County Department of Planning & Zoning regarding Abingdon Business Park, Harford County, Maryland, Third Modified Specimen Tree Removal Waiver Request, "FAST TRACK"
 - e. Abingdon Business Park, Lots No.1, 2 &3 and Edgewood Road Extension, Erosion & Sediment Control Plan, dated August 17, 2021
 - f. Google Map Landsat Image of the Abingdon Business Park Site and surrounding area
 - g. Google Earth Imagery, including historical imagery
 - h. Geologic and Physiographic Province Maps from the Maryland Geological Survey

- i. NRCS County Soil maps for Harford County
 - j. USGS topographic maps (Edgewood quads) from 1949 through 2019
 - k. Historical aerial imagery of Harford County (1938, 1952)
7. Loss of the contiguous forest known as Abingdon Woods will result in irreparable harm if the clearing is not stopped. The basis for my conclusion is the fact the size, extent, and historical persistence of the forested property, its diversity of habitats, and the number and composition of specimen trees slated for removal.
8. Based on aerial photos and topographic maps, the land use of the property has been continuous as largely closed-canopy forest for more than 85 years. Because aerial imagery from 1938 and 1952 show a largely closed canopy, because topographic maps indicate the canopy extent from 1949 to 2019, because of the overstory species composition of the woodland, and the size of specimens in the stand report, it can be reasonably inferred that the larger trees and portions of surrounding forest are well over 100 years old.
9. Old growth forest stands, usually older than 150 years, are exceedingly rare in Maryland and indeed the Mid-Atlantic United States. Old growth forests have distinct characteristics such as a mix of tree ages and species from different successional stages (both which exist on this site), a well-developed understory (this is also described in the forest stand report), edge to interior edaphic gradients, a diverse seed bank, and accumulation of organic matter. These are distinct from woods in earlier successional stages, such as those with even-aged canopies, single dominant species in the overstory (e.g., tulip-poplar or sweetgum), and limited species richness.
10. Even though these woods may not have quite made it to an old-growth state, and even though there is evidence of a history of use and some interior disturbance, such conditions may well be within reach within a generation for some sections of the site, making them an irreplaceable treasure for the county. However, the characteristics of older forests we find today are not reproducible by modern forest restoration practices because the regimes and the landscape context that created them have been altered.
11. Site preparation and grading during modern development is far more effective at removing biological legacies like organic material and seed banks than it was during the late 19th century (when this forest presumably established). Modern growing conditions prevent fire, yet include greater deer browse, more invasive species, more intense storms, and warmer temperatures. Once specimen trees are felled and interior spaces are cleared, the possibility of regaining such conditions again will not be possible within at least one, if not several, human lifetimes.
12. It is often assumed that forests are simply a collection of trees, and tree planting is often viewed as equivalent to “forest restoration”. They are not the same thing. It would take many decades of management to recreate a forest such as the one being cleared here, and that is if all goes well and according to plan, and human society could somehow manage a continuous stream of resources to support the effort. Forests include many groups of

interacting and interdependent plant, animal, and microbial species able to persist and reproduce through time from within an associated set of soils. In addition to being both relatively rare and aesthetically pleasing, specimen trees are protected *precisely* because they often represent a feature of natural woodlands that cannot be readily replaced. The diversity of specimen oak species alone at this site is remarkable; many would be unlikely to survive beyond the period of required maintenance if planted today.

13. The specimen trees represented here are diverse in part because this forest exists in the fall zone between the Piedmont Physiographic Province and the Atlantic Coastal Plain (I-95 typically marks the approximate northern and eastern edge of the Piedmont). Many specimen species like willow and pin oak, southern red oak, and sweetgum, achieve far higher relative dominance in the Coastal Plain than Piedmont forests, even though they do occur along the fall zone. This is also often true for American holly, which takes a considerable time to dominate shaded understories. Acid soil indicators in the family *Ericaceae* such as the blueberries and the mountain laurel, also speak to the persistence of natural soil conditions at this site. These features describe an extensive woodland with a high level of ecological value, in part because it is so poorly represented within Harford County.
14. Although there are a few other wooded properties in the Coastal Plain of Harford County, none are as extensive and intact. The county has a fairly narrow fall zone and coastal corridor (south and east of I-95) and most forested upland areas have already been cleared. At over 300 acres, the property includes several headwater streams, slopes, and dry ridges and shoulders in between. Due to the mix of streamside riparian zones steep slopes, and upland habitats, this site likely represents an unusual combination of moisture and nutrient gradients in proximity. Few properties encompass as many habitats on similar geology within Harford County's Coastal Plain over such an extent, and this environmental legacy will be lost if clearing continues.
15. The facts lead me to conclude that the nature of the harm weighs in favor of halting any further tree removal because the clearing and grading already begun associated with the proposed development will not just remove 49 of 85 specimen trees, it will destroy the contiguity of the woodland with its substantial and diverse interior habitats. Even with limited clearing, there may be remnant parts left, but they will be further fragmented, their connection to other parts of the larger tract gone, the distribution of interior habitats lost, and remaining portions will be increasingly dominated largely by wetlands and streambanks rather than a mix of upland habitats.
16. The specimen trees themselves are critical components of interior forest ecosystems. They tend to have broader crowns that provide distinct habitats for forest dwelling animals, especially if their establishment predated canopy closure, and a broader network of both shallow and deep roots. Recent research suggests that large, well-established trees can be critical supports (e.g., with nutrients and other metabolic compounds) for smaller, subdominant or oppressed trees via shared root mutualisms. Large beeches, in particular, are clonal by root suckers, and the parent tree can be essential in supporting sapling

ramets, whereas large nut bearing trees oaks and beeches, represent important food resources for a variety of animals.

17. Further, the case at issue concerns a *variance* or a *waiver* from the requirements set forth in the Forest Conservation Act (FCA), which I understand to be designed to set reasonable guidelines for protecting forests from development. Because the consequences for failing to halt the clearing are effectively irreversible and the alternative may be temporary, it seems prudent to halt further tree removal until the dispute is settled.
18. Based on the facts, I also conclude that halting further tree clearing will benefit the public interest. Human society depends on forests to produce oxygen and fix carbon from the atmosphere, store energy, absorb and filter precipitation, attenuate stormwater, cool air temperatures, retain and recycle nutrients, and break down organic material. Trees provide some, but not all, of these services. For example, trees fix carbon in their tissues temporarily, but their tissues degrade and will eventually be respired, returning carbon to the atmosphere. True carbon storage happens when forests store carbon in soil, resulting in net accumulation over time.
19. Tree removal halts the carbon storage process, but it also may accelerate carbon loss from forest soils by raising temperatures and accelerating erosion rates. Similarly, trees prevent warming surfaces through shading, but actively cool air temperatures through transpiration, which depends on adequate storage of available water found in organic rich forest soils. Yet it is the presence of tree roots and associated fungal hyphae that provide structural support and reduce erosion. When landscapes are transformed by land use change, these services are degraded. Once the site is graded, any chance to regain those functions through natural processes is effectively lost.
20. In approving the Forest Conservation Plan, the County Department of Planning and Zoning makes the unsupported assertion that removing 49 specimen trees will not adversely affect water quality. This is a rather preposterous statement because it is entirely unsupported (i.e., a single felled tree may not have an adverse effect on downstream water quality, but that presumption does not scale—it may not extend to 5000 trees—and the water quality effect will depend on the size of the stream).
21. In any case, the waiver being granted does not just involve removal of the specimen trees; at this point the trees are the sole component of FCA criteria that would otherwise prevent the *obliteration* of surrounding forest, resculpting of terrain, re-routing of water flow, and the installation of hundreds of acres of impervious surface. There has yet to be any stormwater Environmental Site Design best management practice invented to-date that protects downstream waters from development. Without question, removing the trees and the subsequent development will adversely affect water quality. If there are Tier II waters on this site, it can be safely assumed they will be profoundly degraded by the proposed transformation.
22. In a broader context, my experience is that many Maryland counties and the State are currently going to great lengths to plant trees and engage in reforestation efforts to fulfil

Municipal Separate Storm Sewer System (MS4) permitting requirements or obtain alternative stormwater practice credits from the Chesapeake Bay Total Maximum Daily Load (TMDL) allocation. There is widespread recognition of the need to grow and maintain healthy forests for a variety of environmental reasons, but also for public health and well-being.

23. The FCA lays out criteria to protect large tracts of contiguous woodland, not because its authors opposed development, but because forests are so vital to the common good and it was recognized they were increasingly threatened by our incentive to develop, parcel-by-parcel, without seeing the bigger picture. These linkages have been recognized, implicitly and explicitly, through county zoning, state water quality regulations and permitting programs, and federal statutes. When variances such as those granted in this case undermine the very purpose of codes enacted to protect the collective welfare of the county citizenry, this does not comport with the public interest.

I solemnly affirm under the penalties of perjury that the contents of this document are true to the best of my knowledge, information, and belief.

Executed on September 12, 2022.



Matthew E. Baker

CURRICULUM VITAE

MATTHEW E. BAKER

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EDUCATION

- Ph.D. 2002 University of Michigan, Ann Arbor, MI (Aquatic Ecology)
M.S. 1996 University of Michigan, Ann Arbor, MI (Terrestrial Ecology)
B.A. 1992 Emory University, Atlanta, GA (English and Ecology)

EXPERIENCE IN HIGHER EDUCATION

2021-present *Associate Dean*, University of Maryland, Baltimore County, College of Arts, Humanities, and Social Sciences

2016-present *Professor*, University of Maryland, Baltimore County, Department of Geography and Environmental Systems

2015-2016 *Interim Chair*, University of Maryland, Baltimore County, Department of Geography and Environmental Systems

2015-2021 *Graduate Program Director*, University of Maryland, Baltimore County (Shady Grove Campus), Professional Studies Program in Geographic Information Systems, Department of Geography and Environmental Systems

2011-2016 *Associate Professor*, University of Maryland, Baltimore County, Department of Geography and Environmental Systems

2009-present *Faculty Fellow*, University of Maryland, Baltimore County, Center for Urban Environmental Research and Education

2008-2011 *Assistant Professor*, University of Maryland, Baltimore County, Department of Geography and Environmental Systems

2008-2013 *Adjunct Assistant Professor*, Utah State University, Department of Watershed Sciences, The Ecology Center

2005-2008 *Assistant Professor*, Utah State University, Department of Watershed Sciences, The Ecology Center, Western Center for Monitoring and Assessment of Freshwater Ecosystems

PROFESSIONAL EXPERIENCE

- 2018-2020 *Expert Witness*, Whiteford, Taylor & Preston L.L.P., Baltimore, Maryland
- 2014-present *Expert Witness*, Appalachian Mountain Advocates, Charleston, West Virginia
- 2014-2015 *Maryland Fellow*, National Center for Socio-Ecological Synthesis (SESYNC)
- 2014-2015 *Expert Witness*, Internal Revenue Service, Office of Chief Counsel, Baltimore, Maryland
- 2011-2017 *Research Professor*, U.S. Geological Survey, New England Water Science Center
- 2002-2005 *Research Associate*, Smithsonian Environmental Research Center, Ecological Modeling and Spatial Analysis Laboratory

HONORS RECEIVED

- 2015 IRC Summer Faculty Fellowship, College of Humanities, Arts, and Social Sciences, UMBC
- 2014 Finalist, Boggess Best Paper Award, American Water Resources Association (Weller & Baker 2014)
- 2014-2015 Faculty Research Fellowship, College of Humanities, Arts, and Social Sciences, UMBC
- 2011-12 UMBC Faculty Teaching Scholar
- 2010 Faculty1000 selection for recommended reading (Baker & King 2010)
- 2009 Summer Faculty Fellowship, UMBC
- 2007 William B. Gardner Foreign Travel Award
- 2006 Finalist, New Faculty Advisor of the Year
- 2005 Faculty1000 selection for recommended reading (King et al. 2005)
- 2002 US-IALE, Best Student Presentation Award Winner
- 2002 US-IALE NASA-MSU Award Winner
- 2000-1 Jeffery Lund Award for outstanding scholarship in Forest Ecology
- 2000-1 Samuel A. Graham Award for excellence in Forest Biology
- 1996-8 Merit based scholarships
- 1995-6 Samuel A. Graham Award for excellence in Forest Biology
- 1993 Xi Sigma Pi Forestry Honor Society
- 1992-5 Merit based scholarships

RESEARCH SUPPORT

- 2021 Baker M (Principal) "Computer Vision Hydrography Pre-Pilot", Sponsored by Washington State Department of Ecology (\$20,000)
- 2021 Baker M (Principal) "Howard County Tree Canopy and Forest Cover Assessment", Sponsored by Howard County Office of Sustainability (\$10,000)
- 2020-2023 Baker M (Co-I), Alonzo, M (Principal) "Understanding tree species response to

urban heat using high resolution remote sensing”, Sponsored by the National Science Foundation (NSF-GSS) \$416,659

2019-2020 Baker M (Principal) “Mapping woodland patches across major urban areas of the Eastern US”, USDA Forest Service \$15,000

2018-2024 Baker M (Principal) “High-resolution stream mapping across the Chesapeake Bay Watershed” Sponsored by the U.S. Environmental Protection Agency Chesapeake Bay Program, \$1,200,000

2018-2020 Baker M (Principal) “Patapsco River Restoration Phase II: Post-Removal Survey” Sponsored by American Rivers/NOAA, \$107,380

2018-2019 Baker M (Principal) “Patapsco River Restoration Phase II: Pre-Removal Survey” Sponsored by the American Rivers/NOAA, \$93,680

2017-2019 Baker (Principal) “Continuous mapping of channel features for monitoring aquatic habitat and sediment flux in coastal systems” Sponsored by Maryland SeaGrant, \$44,974

2017-2019 Baker (Principal) “New measures of aquatic habitat for assessing restoration resilience” Sponsored by Maryland SeaGrant, \$43,706

2017-2020 Baker M (Co-PI), Yu M (Principal) “Acquisition of Hybrid CPU/GPU Nodes for the Interdisciplinary UMBC High Performance Computing Facility” Sponsored by the National Science Foundation (NSF-MRI), \$550,000

2016-2018 Baker M (Principal) “Scalable applications for mapping stream channels from high resolution terrain data” Sponsored by the Chesapeake Bay Trust, \$74,997

2015-2016 Baker M (Co-Principal), Miller A (Co-Principal) “Long term monitoring—physical response to lower Patapsco River dam removals: Patapsco River restoration project” Sponsored by the National Oceanographic and Atmospheric Administration, \$170,189

2014-2017 Baker M (Co-Principal), Armstrong D (Principal) “Urbanization and Massachusetts streams: Unpacking the biological effects of impervious cover” Sponsored by Massachusetts Department of Fish & Game, \$405,000

2013-2015 Baker (Principal) “Riparian Indicators of Eco-Hydraulic Function for Improved Watershed Management and Monitoring” Sponsored by Maryland SeaGrant, \$82,500

2012-2015 Baker M (Sen. Pers.), Gobbert M (Principal) “Acquisition of Hybrid CPU/GPU Nodes for the Interdisciplinary UMBC High Performance Computing Facility” Sponsored by the National Science Foundation (NSF-MRI), \$300,000

- 2011-12 Baker M (Co-Principal), Armstrong D (Principal) "Application of Threshold Indicator Taxa Analysis (TITAN) to assess the effects of land-use, impervious cover, dams, and water withdrawals on fish taxa in Massachusetts" Sponsored by the US Geological Survey and Massachusetts Department of Fish & Game, \$34,000
- 2010-11 Baker M (Principal) "Thresholds in aquatic communities in response to exurbanization and environmental change" Sponsored by Maryland SeaGrant, \$58,010
- 2010-15 Baker M (Co-Principal), Swan C (Principal) "The role of network topology and environmental filtering in shaping the ecology of spatially structured communities" Sponsored by the National Science Foundation, \$410,000
- 2010-11 Baker M (Co-Principal), Armstrong D (Principal) "Coordinated Assessment and Protection of New England's Coldwater Fishery Resources: Development of a multivariate TITAN" Sponsored by US Environmental Protection Agency and Massachusetts Department of Fish & Game, \$50,000
- 2010-2015 Baker M (Collaborator), Vigliano P (Principal) "Habitat template and stream fish assemblages of sub basins of Nahuel Huapi lake, Patagonia Argentina" Sponsored by the Argentinian National Scientific and Technical Research Council (CONICET), \$70,000 (approximate)
- 2010-14 Baker M (Sen. Pers.), Welty C (Principal) "Acquisition of Liquid Water Isotope Analyzer Capability for Advancing Hydrologic Research in Baltimore Ecosystem Study LTER" Sponsored by the National Science Foundation (NSF-MRI), \$244,694
- 2009-14 Baker M (Co-Principal), Vidon P (Principal) "Greenhouse gas emissions from riparian zones across a regional hydrogeomorphic gradient" Sponsored by the US Department of Agriculture, \$399,000
- 2007-09 Baker M (Co-Principal), Ramsey D (Principal), "Assessment of ecosystem condition in Grand Teton National Park" Sponsored by the US Department of Interior National Park Service, \$100,000
- 2007-09 Baker M (Principal) "A pilot study of trout invasions in low productivity environments of Andean Patagonia" Utah State University Community Research Initiative, \$19,000
- 2007 Baker M (Principal) "Remote analysis of watershed attributes using Shuttle Radar Topography Mission data: Andean Patagonia" Utah State University Water Initiative, \$6,000
- 2007-09 Baker M (Co-Principal), Kasahara T (Principal) "Evaluating the effect of climate

and topography on water residence time and hydrologic scaling in semi-arid, alpine catchments” Sponsored by the Inland Northwest Research Alliance Water Research Consortium, \$62,500

2007 Baker M (Collaborator), Beard K (Principal), “Spatial distribution of frog invasions on tropical islands” Sponsored by the National Science Foundation-ADVANCE, \$7200

2007 Baker M (Principal) Utah State University New Faculty Competitive Research Grant, \$15,000

2006-10 Baker M (Principal) “A strategic planning tool for targeted buffer restoration and enhanced coastal stewardship ” Sponsored by the National Oceanographic and Atmospheric Administration, \$308,968

2005-08 Baker M (Sen. Pers.) Prince S (Principal), “A watershed Classification System for improved Monitoring and Restoration: Indicators of Watershed Impairment” Sponsored by the US Environmental Protection Agency, \$800,000

1998-02 Baker M (Graduate Student author) Wiley M (Principal), “Ecosystem Structure and Function at the Land-Water Interface” Sponsored by the Michigan Department of Natural Resources, \$250,000

1997 Baker M (Graduate Student Supervisor) Wiley M (Principal), “Aquatic Community Assemblage Structure in Relation to Macro-Habitat Units in Lower Michigan” Sponsored by The Nature Conservancy, \$60,000

Ph.D. STUDENTS

Tanushree Biswas, 2009, committee member, USU

John Lowry, 2010, committee member, USU

Daniel Miles, 2011, committee member, UMBC

John Olsen, 2012, committee member, USU

Nicholas Magliocca, 2012, committee member, UMBC

Garth Linder, 2014, committee member, UMBC

Jonathan Dandois, 2014, committee member, UMBC

Anna Johnson, 2015, committee member, UMBC

Molly Van Appledorn, 2016, Chair, UMBC

Maira Bezerra, 2017, committee member, UMCP

Mariya Shcheglovitova, 2020, committee member, UMBC

Dorothy Bowory, 2020, committee member, UMBC

Adam Dixon, 2021, committee member, UMBC

Alex Rittle, PhD candidate, Chair, UMBC (deceased)

Peter Chirico, withdrew, committee member, UMBC

Peter Claggett, withdrew, Chair, UMBC

Gina Lee, PhD candidate, committee member, UMBC
Bea Van Dam, PhD candidate, committee member, University of Maine
Ohad Paris, PhD candidate, committee member, UMBC
Ben Daniels, PhD candidate, committee member, UMBC

MASTER'S STUDENTS

Kristi Green, 2008, committee member, USU
S. Kirk Dahle, 2009, committee member, USU
Molly Van Appledorn, 2009, Chair, USU
Andrew Hill, 2010, Co-Chair, USU
Amanda Schulz, 2010, Co-Chair, USU
Jennifer Li, 2011, committee member, UMBC
Mattie Whitmore, 2011, Co-Chair, UMBC
Matthew Panunto, 2012, Chair, UMBC
Christina Simini, 2012, Chair, UMBC
Daniel Jones, 2013, Co-Chair, UMBC
Haley Martin, 2013, Co-Chair, UMBC
Mitchell Donovan, 2014, committee member, UMBC
Christopher Zink, 2014, Chair, UMBC
Janet Fairbank, 2014, Chair, UMBC
Michael Glassman (withdrew 2015), Chair, UMBC
Alex Martin, 2016, committee member, UMBC
Charles Wahl, 2015, committee member, UMBC
Katherine Ralston, 2017, Chair, UMBC
Marina Metes, 2018, committee member, UMBC
Zach Clifton, 2018, Chair, UMBC
Rikke Jepsen, 2018, committee member, UMBC
Daniel Cunningham, 2019, committee member, UMBC
Hayley Oakland, 2020, Chair, UMBC
April Sparkman, 2021, committee member, UMBC
Beatriz Shobe, 2021, committee member, UMBC
Kaitlyn Holtsclaw, withdrew, Chair, UMBC
Nicati Robidoux, 3rd year, Chair, UMBC
Michelle, Katoski, 3rd year, Chair, UMBC
Tyrah Cobb-Davis, 2nd year, Co-Chair, UMBC
Leah Staub, 2nd year, committee member, UMBC
Meagan Fairfield-Peak, 2nd committee member, UMBC
Katheryn Barnhardt, 2nd year, committee member, UMBC
Drew Powell, 2nd year, Co-Chair, UMBC
Zach Banham, 1st year, Chair, UMBC
Erin Hamner, 1st year, Co-Chair, UMBC
Anita Kraemer, 1st year, Chair, UMBC
Philip Worster, 1st year, Chair, UMBC

UNDERGRADUATE STUDENTS

Micah Polsky, Research Assistant, 2022, UMBC
Michael Allman, Research Assistant, 2022, UMBC
Michael Allman, Research Assistant, 2021, UMBC
Laura Wortman, Research Assistant, 2021, UMBC
Caitlin Beckjord, Research Assistant, 2021, UMBC
Leah Rubin, Research Assistant, 2020, UMBC
Ioana Dragichi, Research Assistant, 2020, UMBC
Michelle Chan, Research Assistant, 2020, UMBC
Ethan Crookshank, Research Assistant, 2020, UMBC
Breanna Byrd, Research Assistant, 2020, UMBC
Will Jones, Research Assistant, 2020, UMBC
Meagan Allison, Research Assistant, 2019, UMBC
Ioana Dragichi, Research Assistant, 2019, UMBC
Santiago Muevar, Research Assistant, 2018, UMBC
Ryan Woolbridge, Research Assistant, 2018, UMBC
Kristian Nelson, Research Assistant, 2018, UMBC
Chiamaka Chuckwuma, Research Assistant, 2018, UMBC
Carly Toulon, Research Assistant, 2018, UMBC
Jessica Whitacre, Research Assistant, 2018, UMBC
Adam Segal, Research Assistant, 2018, UMBC
Juan Camacho, Research Assistant, 2017, UMBC
Michelle Katoski, Research Assistant, 2017-2018, UMBC
Siarah Beall, Research Assistant, 2017, UMBC
Jaelyn Bos, Research Intern 2017, UMBC
Dan Cunningham, Research Intern 2015, UMBC
Alyssa Houde, Research Intern 2015, UMBC
Parker Damm, Research Intern 2015, UMBC
Ellen Woytowitz, Research Intern 2015, UMBC
Jaelyn Bos, Research Intern 2015, UMBC
Meghna Bhatt, Research Assistant 2014-2015 UMBC
Briana Diacopopulous, Research Assistant 2014-2015 UMBC
Zach Clifton, Research Assistant 2014-2015 UMBC
Jaelyn Bos, Research Intern 2014-2015 UMBC
Patrice Matthews, Service Learning Intern, 2013, UMBC
Gabrielle Filippi, Service Learning Intern 2012, UMBC
Matthew Schley, URA advisee, 2012-2013, UMBC
Matthew Schley, Research Intern, Fall 2011, UMBC
Haley Martin, Research Intern, Spring 2010, UMBC
Matthew Schley, Research Fellow, Spring 2010, UMBC
Sean Kain, Research Technician, Spring-Summer 2009, Mentor, UMBC
Doug Call, Research Intern, Summer 2002, mentor, UVA

James Graves, Research Intern, Summer 2002, Mentor, Earlham College
 Kristina Herz, Research Intern, Summer 2003, Mentor, PSU
 Michael Marshall, Research Intern, Summer 2003, Mentor, Clark University
 Medora Hackler, Research Intern, Summer 2004, Mentor, Sweet Briar College

PUBLICATIONS, PRESENTATIONS, and CREATIVE ACHIEVEMENTS

PEER-REVIEWED WORKS (>3400 Google Scholar Citations, H index = 27, i10 index = 44)

Package TITAN2; Threshold Indicator Taxa Analysis (v2.2), published on the Comprehensive R Analysis Network (CRAN), December 2019: <https://cran.r-project.org/web/packages/TITAN2/index.html>

*Articles (co-lead in bold, *student author)*

2022

58. Van Appledorn*, M and ME Baker. (*in press*). Flood regimes alter the role of landform and topographic constraint on functional diversity of floodplain forests. *Ecography*.
57. Arseniou* G, D MacFarlane, K Calders, M Baker. (*in press*). Accuracy differences in aboveground woody biomass estimation with terrestrial laser scanning for trees in urban and rural forests in different leaf conditions. *Trees: Structure and Function*.
56. Morzillo, AT, KJ Lautar, KL King, L Rhodes, L Scott, M Johnson, M Clarke, LK Campbell, LR Johnson, S Pincetl, NF Sonti, DH Locke, JP Schmit, RT Fahey, ME Baker. 2022. A tale of urban forest patch governance in four eastern US cities. *Urban Forestry & Urban Greening*. [10.1016/j.ufug.2022.127693](https://doi.org/10.1016/j.ufug.2022.127693).
55. Mertes*, M, DK Jones*, ME Baker, AJ Miller, D Hogan, JV Loperfido, KH Hopkins. 2022. Considerations for Drainage Network Extraction from High-Resolution Topographic Data Across Variable Land Uses. *Journal of the American Water Resources Association*. <http://dx.doi.org/10.1111/1752-1688.13012>
54. Swan, CM, ME Baker, D Borowy*, A Johnson*, M Shcheglovitova*, A Sparkman*, F Valente Neto*, M Van Appledorn*, N Voelker*. 2022 Loss of Phylogenetic Diversity under Landscape Change. *Science of the Total Environment*.

2021

53. Alonzo, M, M Baker, Y Gao, V Shandas. 2021. Spatial configuration and time of day impact the magnitude of urban tree canopy cooling. *Environmental Research Letters* <https://iopscience.iop.org/article/10.1088/1748-9326/ac12f2>

2020

52. Davies, SJ et al. 2020. ForestGEO: Understanding Forest Diversity and Dynamics through a Global Observatory Network. *Biological Conservation* 253, 108907
51. Dixon*, A, M Baker, E Ellis. 2020. Agricultural landscape composition linked with acoustic measures of avian diversity. *Land* <https://doi.org/10.3390/land9050145>.

50. Bezerra^{*}, M, M Baker, M Palmer, S Filoso. 2020. Sugarcane agriculture exacerbates gully formation in headwater catchments in Brazil. *Journal of Env. Management* 110271.
49. Pickett, ST, et al. 2020. Theoretical perspectives of the Baltimore Ecosystem Study: conceptual evolution in a social-ecological research project. *Bioscience* 70(4):297–314. <https://doi.org/10.1093/biosci/biz166>

2019

48. Baker, ME, ML Schley^{*}, JO Sexton. 2019. Impacts of expanding impervious surface on specific conductance in urbanizing streams. *Water Resources Research* <https://doi.org/10.1029/2019WR025014>.
47. Van Appledorn^{*} M, ME Baker, AJ Miller. 2019. Empirical evaluation of 2D unsteady hydraulic models for applications in floodplain forest ecology. *Physical Geography* <https://doi.org/10.1080/02723646.2019.1676186>.
46. Phillips^{*} T, M Baker, K Lautar, I Yessalonis, M Pavao-Zuckerman. 2019. The capacity of urban forest patches to infiltrate stormwater is influenced by soil physical properties and soil moisture. *Journal of Environmental Management* 246: 11-18.
45. Macchi^{*}, L, C Levers, M Baumann, M Baker, T Kummerle. 2019. Satellite-based tree and shrub cover reveal thresholds in bird community in the South American dry Chaco. *J. Applied Ecology*.
44. Van Appledorn^{*} M, ME Baker, AJ Miller. 2019. River-valley morphology, basin size, and flow-event magnitude interact to produce wide variation in flooding dynamics. *Ecosphere* 10(1):e02546.

2018**2017**

43. Dandois^{*}, J, M Baker, M Olano, G Parker, E Ellis. 2017. What is the Point? Using Computer Vision Point Clouds to Observe Vegetation Structure and Spectral Properties. *Remote Sensing* 9(4), 355; doi:10.3390/rs9040355.
42. Collins, MJ, NP Snyder, G Boardman, WSL Banks, M Andrews, ME Baker, M Conlon, A Gellis, S McClain, A Miller, P Wilcock. 2017. Channel response to sediment release: insights from a paired dam-removal analysis. *Earth Surface Processes and Landforms* 10.1002/esp.4108.

2016

41. Donovan^{*} M, AJ Miller, ME Baker. 2016. Reassessing the role of milldams in Piedmont floodplain development and remobilization. *Geomorphology* 268:133-145.
40. Utz, R, K Hopkins, L Beesley, D Booth, R Hawley, ME Baker, M Freeman, and K Jones. 2016. Do specific natural watershed and channel attributes confer ecological resistance to urbanization in streams? *Freshwater Science* 35(1):380-397.
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15. **Baker ME** and RS King. 2010. A new method for identifying and interpreting ecological community thresholds. Methods in Ecology & Evolution 1:25-37.

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5. Baker, ME, MJ Wiley, PW Seelbach, and ML Carlson. 2003. A GIS-based index of groundwater potential for aquatic resource inventory, assessment, and environmental management. *Environmental Management* 32:706-719.
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3. Baker, ME, MJ Wiley, and PW Seelbach. 2001. GIS-based hydrologic modeling of riparian areas: implications for stream water quality. *Journal of the American Water Resources Association* 37(6): 1615-1628.
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1. Seelbach, PW, MJ Wiley, JC Kotanchik and ME Baker. 1997. A landscape-based ecological classification system for river valley segments in Lower Michigan. Fisheries Research Report No. 2036, Michigan Department of Natural Resources, Ann Arbor.

Peer-reviewed Book Chapters

5. King, RS and ME Baker. 2014. Use, misuse, and limitations of Threshold Indicator Taxa Analysis (TITAN) for estimating ecological community thresholds. In: G. Guntenspergen (editor), *Application of Threshold Concepts in Natural Resource Decision Making*, Springer, New York.
4. Tarboton, DG and ME Baker. 2008. Toward an algebra for terrain-based flow analysis. Chapter 12 in N. Mount, G. Harvey, G. Priesthall, and P. Apin. (eds). *Representing, Modelling, and Visualizing the Natural Environment*. Innovations in GIS series. CRC Press-Taylor & Francis, London.
3. Gregory, S, A Allen, M Baker, K Boyer, T Dillaha, and J Elliott. 2007. Realistic expectations of timing between conservation and restoration actions and ecological responses. In M. Schnepf (ed.), *Managing Agricultural Landscapes for Environmental Quality*. Soil and Water Conservation Society.

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1. Crow, TR, ME Baker, and BV Barnes. 2000. Diversity in riparian landscapes. In ES Verry, JW Hornbeck, and CA Dollloff (eds.) Riparian Management in Forests of the Continental Eastern United States. Lewis Publishers, New York.

Conference Proceedings

2. Tarboton, DG, KAT Schreuders, DW Watson, and ME Baker. 2009. Generalized terrain-based flow analysis of digital elevation models. 18th World IMACS/MODSIM Congress, Cairns, Australia, July 2009.
1. Nielson, BT, C. Bandaraogoda, ME Baker, JS Horsburgh, DK Stevens. 2009. Watershed modeling for water quality trading. Proceedings of the AWRA summer specialty conference, Snowbird, Utah, June 2009.

NON-PEER-REVIEWED WORKS

4. Miller, A., M. Baker, K. Boomer, D. Merritts, K. Prestegard, and S. Smith. 2019. Legacy Sediment, Riparian Corridors, and Total Maximum Daily Loads. STAC Publication Number 19-001, Edgewater, MD. 64pp.
3. Baker, M, D Saavedra, M Norton. 2018. Scope#10: Methodology for developing high-resolution stream and waterbody datasets for the Chesapeake Bay watershed. Final report to the Chesapeake Bay Trust.
2. Morzillo, AT, JW Hollister, CA Drew, ME Baker, JM Bossenbroek, ME Rocca, and C Mazzarella. 2008. A young scientist's guide to gainful employment: recent graduates' experiences and successful strategies. Bulletin of the Ecological Society of America 89(2):193-203.
1. Wiley, MJ and ME Baker. 1997. Fish assemblage structure in relation to macro-habitat (valley segment) units in Lower Michigan. The Nature Conservancy, Freshwater Initiative.

WORKS SUBMITTED OR IN PREPARATION

Submitted

- Dixon*, AP, ME Baker, EC Ellis (in revision). Collaborating with farmers using bioacoustic monitoring to assess avian diversity and habitat in intensive agricultural landscapes. Ecological Applications.
- Baker ME, I Yessalonis, K Lautar, L Templeton*, B Shoebe*, J Bos*, and Nancy Sonti. (in review) Distributed urban forest patch characterization detects edge effects for monitoring and management. Ecological Applications

In Preparation

- Weller, DE, ME Baker, RS King (in prep). Enhancing statistical methods for quantifying how spatial pattern mediates the impact of landscape features on ecological response. *Methods in Ecology & Evolution*.
- Baker, M, S Van Ryswick, A Miller. (in prep) Tracking channel change following dam removal using low altitude remote imagery. *Earth Processes and Landforms*
- Miller A, M Baker, S Van Ryswick, M Andrews, M Collins. (in Prep) New evidence of process-based evacuation following dam removals. *Earth Processes and Landforms*
- Baker ME, J Bos*, and RS King. (in prep). Reconsidering taxon-specific contributions to measures of community change: updates to Threshold Indicator Taxa Analysis. *Freshwater Science*.
- Baker ME and D Saavedra*. (in prep). Stream Mapping Applications Using Geomorphons (SMAUG): geomorphic delineation of valley and channel networks. *Water Resources Research*
- Oakland*, H, M Baker, and S Kroll. (in prep). Assessing aquatic habitat using low altitude remote imagery. *Freshwater Science*.
- Oakland*, H, M Baker, and S Kroll. (in prep). Some restorations reduce habitat heterogeneity. *Ecological Applications*.
- Van Appledorn* M and ME Baker. (in prep). Regional patterns of flood regime across the conterminous United States. *Water Resources Research*.
- Van Appledorn* M, AJ Miller, and ME Baker. (in prep). Differentiation of functional traits along flood regime gradients reveal role of hydraulic signals in structuring floodplain forests. *Ecology*.

PRESENTATIONS

Presentations and Posters (Non-juried/Refereed)

- Oakland, H and ME Baker. 2020. Continuous assessment reveals homogenization of stream habitat following restoration. Maryland Water Monitoring Council, Dec 2020, Baltimore, Maryland.
- Baker ME. 2020. Hyper resolution stream channel delineation and dimensions. Cascade Cities & Fire, Portland, Oregon, October 2020.
- Baker ME and D Saavedra. 2020. Development and application of hyper resolution stream channels in Chesapeake Bay Watersheds. US EPA Region 3, Stream Resilience Working Group, October 2020, Philadelphia Pennsylvania.
- Baker ME and D Saavedra. 2019. Development and application of automated channel extraction from LiDAR in Chesapeake Bay Watersheds. Society for Freshwater Science, May 2019, Salt Lake City Utah.
- Oakland, H, M Baker, and S Kroll. 2019. Assessing aquatic habitat in stream restorations using low altitude remote imagery. Society for Freshwater Science, May 2019, Salt Lake City Utah.
- Baker, ME, A Miller, S Van Ryswick, E Boyd, M Cashman, M Collins, M Andrews. Tracing geomorphic change and downstream progress of sediment released by removal of Bloede Dam, Patapsco River, Maryland. American Geophysical Union, December 2018, Washington, DC.
- Baker, ME. Assessing causality in stream assessment and restoration: a case study in

- Appalachian surface mining. Invited speaker, Smithsonian Environmental Research Center, November 2018.
- Baker ME and D Saavedra. 2018. Development of automated channel extraction from LiDAR in Chesapeake Bay Watersheds. American Water Resources Association, November 2018, Baltimore Maryland.
- Baker, ME. What We Have Learned About Baltimore's Forests. Oral Presentation for Baltimore's Fantastic Forest Forum, Cylburn Arboretum, November 2017, Baltimore MD.
- Rittle, A, M Baker, M Cashman, and A Miller. Workflow Evaluation of Error and Distortion in SfM-Derived Point Clouds in Fluvial Environments. Oral Presentation for the American Geophysical Union. Dec 2017. New Orleans, LA.
- Baker, ME, D Jones, E Woytowicz, A Miller. Alternative models of hydrogeomorphic connectivity in urbanizing Piedmont landscapes. Society for Freshwater Science Annual Meeting. May, 2017. Raleigh, NC.
- Rittle, A, ME Baker, and AJ Miller. A UAV-SfM Approach for extracting Channel Bathymetry and Fluvial Features. Oral Presentation for the American Association of Geographers. April 2017. Boston, MA.
- Clifton, Z and ME Baker. Assessing the limits of aerial detection of floodplain sediment storage via multi-temporal LiDAR. Oral Presentation for the US- International Association for Landscape Ecology Annual Symposium. April 2017. Baltimore, MD.
- Van Appledorn, M and ME Baker. Incorporating 2D hydraulic modeling in floodplain ecosystem investigation. Oral Presentation for the US- International Association for Landscape Ecology Annual Symposium. April 2017. Baltimore, MD.
- Van Appledorn, M and ME Baker. Flooding does not always constrain riparian species composition: evidence of environmental filtering and limiting similarity in floodplain forests. Oral Presentation for the US- International Association for Landscape Ecology Annual Symposium. April 2016. Ashville, NC.
- Van Appledorn, M and ME Baker. Flooding does not always constrain riparian species composition: evidence of environmental filtering and limiting similarity in floodplain forests. Oral Presentation for the Ecological Society of America Annual Meeting. August 2015. Baltimore, MD.
- Baker, ME. Landscape approaches to nutrient and sediment management in streams: past research and future directions. *Invited presentation* Society for Freshwater Science Annual Meeting. May, 2015. Milwaukee, WI.
- Van Appledorn, M and ME Baker. Quantifying hydrologic and functional diversity of riparian forest ecosystems in Maryland: towards a more mechanistic understanding of abiotic-biotic interactions for cost-effective restoration. Invited Oral Presentation for the Chesapeake Modeling Symposium. May 28-29, 2014. Annapolis, MD.
- Baker, ME. Taxon-specific contributions to community change: updates to Threshold Indicator Taxon Analysis. Oral Presentation for the Joint Aquatic Science Meetings. May, 2014. Portland, OR.
- Van Appledorn, M and ME Baker. Regional comparison of flood regimes and functional trait distributions. Oral Presentation for the Joint Aquatic Science Meetings. May, 2014. Portland, OR.
- Baker, ME. Impacts of urbanization on stream conductance over 25 years. Oral Presentation for

- the Society for Urban Stream Ecology. May, 2014. Portland, OR
- Van Appledorn, M and ME Baker. A comparison of functional trait distributions among riparian floodplain landforms. Oral Presentation for the Ecological Society of America Annual Meeting. August, 2013. Minneapolis, MN.
- Van Appledorn, M and ME Baker. A comparison of functional trait distributions of riparian plant species from floodplain landscapes in Michigan and Maryland. Poster Presentation for the US- International Association for Landscape Ecology Annual Symposium. April, 2013. Austin, TX.
- Baker, ME and RS King. Reconciling perspectives of community change: refinements to Threshold Indicator Taxa Analysis. North American Benthological Society (NABS), Louisville, KY, June 2012.
- King, RS and ME Baker. Multiple lines of evidence of nonlinear ecological community response to novel environmental gradients. North American Benthological Society (NABS), Louisville, KY, June 2012.
- Van Appledorn, M. and M.E. Baker. Evaluating the role of environmental controls on riparian plant communities: relative importance of climate and hydrologic processes varies by riparian plant community type. US-International Association for Landscape Ecology Annual Symposium. April, 2012. Newport, RI.
- Baker, ME and JC Schmidt. Some Implications of recent climate change in Grand Teton National Park. 2012 US-IALE Annual Meeting, Newport Rhode Island.
- VanAppledorn M and ME Baker. Evaluating the role of environmental controls on riparian plant communities: relative importance of climate and hydrologic processes varies by riparian plant community type. . 2012 US-IALE Annual Meeting, Newport Rhode Island.
- Panunto MH and ME Baker. River Network Path-Dependence: effects of valley segment sequencing on floodplain hydroperiods. . 2012 US-IALE Annual Meeting, Newport Rhode Island.
- VanAppledorn M and ME Baker. How do longitudinal patterns of in-channel sediment transport relate to floodplain heterogeneity. 2011 US-IALE Annual Meeting Portland, OR.
- Panunto MH and ME Baker. Effect of valley segment sequencing on floodplain hydroperiod. 2011 US-IALE Annual Meeting Portland, OR.
- Baker, ME, RS King, and PF Kazyak. 2010. Strikingly consistent biodiversity losses to watershed impervious cover across taxonomic groups revealed by Threshold Indicator Taxa Analysis (TITAN). ALSO/NABS Joint Meeting, Santa Fe, NM.
- Weller, DE, ME Baker, and TE Jordan. 2010. Nitrate removal by riparian buffers and in-stream processes in Chesapeake Bay Catchments. ALSO/NABS Joint Meeting, Santa Fe, NM.
- King, RS and ME Baker. 2010. Considerations for analyzing ecological community thresholds in response to anthropogenic environmental gradients. ALSO/NABS Joint Meeting, Santa Fe, NM.
- Baker ME and RS King 2010. A new method for detecting biodiversity and ecological community thresholds. US-IALE Annual Meeting Athens, GA.
- VanAppledorn M and ME Baker. New software tools for strategic prioritization of riparian coservation and restoration. 2010 US-IALE Annual Meeting Athens, GA.
- Panunto M and ME Baker. Using a hydrogeomorphic typology to understand distributions of riparian buffers in Central Indiana. US-IALE Annual Meeting Athens, GA.

- Van Appledorn M and ME Baker 2009 Effects of relative wetness on riparian buffers potential in Maryland. NABS Grand rapids, MI.
- Baker, ME, DE Weller, TE Jordan 2009 Effects of riparian buffers on watershed nitrate discharges: new models and m management implications. NABS annual meeting, Grand Rapids, MI.
- King RS and ME Baker. 2009. Threshold Indicator Taxa Analysis (TITAN): a new method for detecting biodiversity and ecological community thresholds NABS, Grand Rapids, MI.
- Van Appledorn M and ME Baker 2009 Effects of relative wetness on riparian buffers potential in Maryland. IALE Annual meeting, Snowbird, UT.
- Weller, DE, ME Baker, and TE Jordan Effects of riparian buffers on watershed nitrate discharges: new models and m management implications. IALE Snowbird, UT.
- Baker ME and RS King Threshold Indicator Taxa Analysis (TITAN): a new method for detecting biodiversity and ecological community thresholds IALE ,Snowbird, UT.
- Weller, DE, ME Baker, and TE Jordan Effects of riparian buffers on watershed nitrate discharges: new models and m management implications. EBM Baltimore, MD.
- Baker, ME, DE Weller, TE Jordan New tools for measuring the effects of riparian buffers. EBM Baltimore, MD.
- Baker, ME and DG Tarboton. Generalized models of flow across terrain using digital elevation models. American Geophysical Union, San Francisco, CA December 2008.
- Van Appledorn, M and ME Baker. A Comparison of Riparian Restoration Strategies for Water Quality Improvement within and Among Watersheds. AWRA Summer specialty conference Virginia Beach, VA June 2008.
- Boomer K, DE Weller, ME Baker, and TE Jordan. Using Fine-Resolution Topography Data to Infer Groundwater Flowpaths and Denitrification Potential in Riparian Wetlands in the Chesapeake Bay Watershed. AWRA Summer specialty conference Virginia Beach, VA June 2008.
- Van Appledorn, M and ME Baker. A simulation comparing spatially-explicit riparian restoration strategies for water quality improvement within and among watersheds. International Association of Landscape Ecology (US-IALE), Madison, WI, April 2008.
- Baker, ME and DG Tarboton. New approaches for representing uncertainty in watershed connectivity. International Association of Landscape Ecology (US-IALE), Madison, WI, April 2008.
- Tarboton, DG, KA Schreuders, ME Baker. New TauDEM tools for deriving hydrologic information from digital elevation models. AWRA 2008 Spring Specialty Conference, San Mateo, CA, March 2008.
- Tarboton, DG, ME Baker, KA, Schreuders. Terrain analysis and the modeling of catchment architecture. European Geophysical Union, Vienna, Austria, April 2008.
- Baker, ME, MJ Wiley. Using structural equations to explore multi-scale predictions of riparian hydrology. *Invited*: North American Benthological Society (NABS), Columbia, SC, May 2007.
- Baker, ME, MA White, DE Weller, TE Jordan. Using land surface phenology to explore the effects of landscape and riparian features on nutrient discharges in tributary watersheds of Chesapeake Bay. International Association of Landscape Ecology (US-IALE), Tucson, AZ,

- April 2007.
- White, MA, ME Baker, DE Weller, TE Jordan. Land surface phenology in eastern United States watersheds: relationships between remote sensing metrics, stream chemistry, snow cover, and leaf and bird phenology. American Geophysical Union, San Francisco, CA.
- Baker, ME, DE Weller, TE Jordan. Effects of Stream Map Resolution on Measures of Riparian Buffer Distribution and Nutrient Retention Potential. American Geophysical Union, Baltimore, MD May 2006.
- Baker, ME, DE Weller, TE Jordan. Watershed-scale thresholds in the potential effectiveness of riparian buffers. US-IALE, San Diego, CA, March, 2006.
- Baker, ME, DE Weller, TE Jordan. Transport-distance effects in regional predictions of nitrate discharge: implications for nitrogen transformation. NABS/AGU Joint Session, New Orleans, LA, June 2005.
- Baker, ME, DE Weller, TE Jordan. Improved methods for quantifying patterns of riparian buffers US-IALE, Syracuse, NY, April, 2005.
- Baker, ME, DE Weller, TE Jordan. Effect of within-watershed land cover arrangement on nutrient discharge. NABS, Vancouver, BC, June 2004.*
- Baker, ME, DE Weller, TE Jordan. Landscape-level effects of riparian buffers: considering spatial configuration and hydrologic routing in geographic predictions of nutrient discharge. US-IALE, Las Vegas, NV, April, 2004
- Baker, ME, DE Weller, TE Jordan. Landscape-level effects of riparian buffers: considering spatial configuration and hydrologic routing in geographic predictions of nutrient discharge. **Invited:** Soil Science Society of America, Denver, CO, October, 2003.
- Baker, ME, DE Weller, TE Jordan. The effect of distance-weighted source areas in geographic predictions of nutrient discharge from coastal-plain watersheds. NABS, Athens, GA, May, 2003.
- Baker, ME, DE Weller, TE Jordan. The effect of distance-weighted source areas in geographic predictions of nutrient discharge. US-IALE, Banff, Alberta, Canada, April, 2003.
- Baker, ME, MJ Wiley. Climatic and hydrologic influences on the spatial variation of riparian forests. NABS, Pittsburgh, PA, May 2002.
- Baker, ME, MJ Wiley, PW Seelbach. GIS-based modeling of riparian hydrology and stream water quality. US-IALE, Lincoln, NE, April 2002.
- Baker, ME, MJ Wiley. Predicting spatial variation in riparian hydrology and forest composition across Lower Michigan. US-IALE, Tempe, AZ, April 2001.
- Baker, ME, MJ Wiley. Using GIS-based models to understand riparian function and forest composition. 62nd Midwest Fish and Wildlife Conference, Minneapolis, MN, December 2000.
- Baker, ME, MJ Wiley. Predicting the structure and function of riparian ecosystems. AWRA conference on Riparian Ecology and Management, Portland, OR, July 2000.
- Baker, ME, MJ Wiley, PW Seelbach. GIS modeling of potential groundwater sources to rivers. IMAGINE GIS conference, Lansing, MI, May 2000.
- Baker, ME, MJ Wiley, PW Seelbach. A spatially-explicit groundwater model for river and watershed management. US-IALE, Ft. Lauderdale, FL, April 2000.
- Baker, ME, BV Barnes, LE Cablk. Considering the diversity of river valley and wetland

ecosystems in both regional and local contexts. *Invited*: The role of embedded wetlands in an upland matrix. Ecological Society of America, Baltimore, MD, July 1998.

Baker, ME, BV Barnes. Landscape controls on riparian ecosystems. 59th Midwest Fish and Wildlife Conference, Milwaukee, WI, December 1997.

Other Professional Presentations

Baker, ME. 2014. Impacts of development on Ten Mile Creek. Testimony before the Montgomery County Council. Jan-Feb. Rockville, MD

Baker, ME. 2010. Opportunities at the interface of hydrology and ecology. National Research Council's Committee on Challenges and Opportunities in the Hydrologic Sciences. National Academy of Sciences, Washington DC, Invited Speaker, Sept 9th, 2010.

Baker ME and RS King 2009 Threshold Indicator Taxa Analysis (TITAN): a new method for detecting biodiversity and ecological community thresholds. Fall BES meeting, Baltimore, MD.

Baker ME and RS King 2009 Threshold Indicator Taxa Analysis (TITAN): a new method for detecting biodiversity and ecological community thresholds. EPA Regional Stormwater meeting, Edison NJ.

Media Activities

Chicago Tribune. Sept 5th, 2018: <http://www.chicagotribune.com/sns-drones-to-track-one-of-the-largest-dam-removals-on-the-eastern-seaboard-100071-20180905-story.html>

US News & World Report, Sept 5th, 2018: <https://www.usnews.com/news/best-states/articles/2018-09-05/commentary-drones-to-track-one-of-the-largest-dam-removals-on-the-east-coast>

The Conversation, Sept 5th, 2018: <http://theconversation.com/drones-to-track-one-of-the-largest-dam-removals-on-the-eastern-seaboard-100071>

Technical.ly, July 24, 2018: <https://technical.ly/baltimore/2018/08/24/a-new-mapping-effort-will-provide-a-closer-look-at-the-streams-that-feed-the-chesapeake-bay/>

NPR Here and Now, April 13th 2017: <http://www.npr.org/2017/04/13/522607589/in-coal-country-environmental-regulations-are-creating-jobs>

Ohio Valley Resource, March 31st, 2017: <http://ohiovalleyresource.org/2017/03/31/restoration-scientists-concerns/>

Charleston Gazette-Mail, January 4th, 2017: <http://www.wvgazettemail.com/news-cops-and-courts/20170104/us-court-upholds-mountaintop-removal-pollution-ruling>

Bay Journal, December 2016:

http://www.bayjournal.com/article/baltimore_group_can_see_the_urban_forests_amid_the_trees

Washington Post, February 4th 2014: http://www.washingtonpost.com/local/md-politics/council-members-push-proposal-to-sharply-limit-new-construction-in-ten-mile-creek/2014/02/03/a40c6cd0-8d3b-11e3-98ab-fe5228217bd1_story.html

WYPR Maryland in the Morning with Shelia Kast, February 10, 2010:

<http://mdmorn.wordpress.com/2010/02/09/210102-measuring-the-biological-effects-of-development/>

Environmental Protection online, February 4th, 2010:

<http://eonline.com/articles/2010/02/04/ecologists-create-a-more-precise-way-to-measure-human-impacts.aspx>

Baltimore Sun, B'more Green with Meredith Cohn, February 3rd, 2010:

http://weblogs.baltimoresun.com/features/green/2010/02/new_way_found_to_tell_when_spe.html

Science Centric, February 3rd, 2010: <http://www.sciencecentric.com/news/10020331-researcher-develops-new-method-detecting-biodiversity-losses.htm>

B,more media interview with Walaika Haskins, February 1st, 2010:<http://www.bmoremedia.com/innovationnews/umbcecologist020210.aspx>

Legal Activities (in which I have been deposed or provided expert testimony)

1. IRS easement assessment (146 Tax Court No. Docket 5445-13, Baltimore, MD)
2. *Ohio Valley Environmental Coalition v. Fola Coal*, (S.D. W.Va. 2:13-21588) Liability
3. *Ohio Valley Environmental Coalition v. Fola Coal*, (S.D. W.Va. 2:13-5006) Remedy
4. *Ohio Valley Environmental Coalition v. Fola Coal*, (S.D. W.Va. 2:13-21588) Remedy
5. *Ohio Valley Environmental Coalition v. Fola Coal*, (S.D. W.Va. 2:15-1371) Liability
6. *Canaan Christian Church and Burtonsville Crossing, LLC and Burtonsville Associates, LLC and Jennifer M. Sarem and Marion G. Sarem v. Montgomery County, Maryland and Montgomery County Council and Isiah Leggett*, (MD Case No.:16-cv-03698-TDC)

Courses Taught

Workshop: Threshold Indicator Taxa Analysis (TITAN) and analysis of biological community data in R. Society for Freshwater Science: Mid-Atlantic Chapter, January 30th, 2015, Philadelphia, PA.

Workshop: Threshold Indicator Taxa Analysis (TITAN) and analysis of biological community data in R. Association of Mid-Atlantic Aquatic Biologists, March 27th-28th, 2014, Berkeley Springs, WV.

Workshop: Statistical Workshop for water resource managers: Analysis of biological community data in R. New England Association of Environmental Biologists, March 25-26th, 2014, Burlington, VT.

Workshop: R statistical computing and training and Threshold Indicator Taxa Analysis (TITAN). New England Association of Environmental Biologists, March 19-20th, 2013, Lake Placid, NY.

Workshop: 2011. R statistical computing and Threshold Indicator Taxa Analysis (TITAN). USGS New England Water Resource Center. Feb.

Workshop: 2010. R statistical computing and Threshold Indicator Taxa Analysis (TITAN). USGS Maryland-Delaware-Virginia Water Resource Center. Oct.

Geography and Environmental Systems (UMBC) 600 Quantitative Methods

Geography and Environmental Systems (UMBC) 405 Applied Landscape Ecology

Geography and Environmental Systems (UMBC) 110 Physical Geography

Geography and Environmental Systems (UMBC) 404 Forest Ecology

Geography and Environmental Systems (UMBC) 419 Watershed Analysis and Modeling

Geography and Environmental Systems (UMBC) 319 Watershed Science and Management

Geography and Environmental Systems (UMBC) 400 Ecology and Management of Riparian Ecosystems

Geography and Environmental Systems (UMBC) 602 Research Methods

Geography and Environmental Systems (UMBC) 689 Departmental Seminar

Watershed Sciences (USU) 4930/6920 Geographic Information Science.

Watershed Sciences (USU) 6200 Watershed Analysis.

Watershed Sciences (USU) 5640 Riparian Ecology and Management.

Watershed Sciences (USU) 5490 Small Watershed Hydrology, Guest lectured on GIS applications in hydrology and watershed modeling.

Environment and Society (USU) 6200 Bioregional Analysis and Planning, Guest lectured on analysis and assessment of watershed hydrology, four 2-hr class periods.

Natural Resources and Environment (UMich) 511 Introduction to Aquatic Ecosystems, TA responsible for laboratory content delivery, taught 5-hr laboratory sections and led field trips for two semesters.

Natural Resources and Environment (UMich) 435 Forest Ecology, TA and assisted in content delivery, taught field laboratory section.

Natural Resources and Environment (UMich) 337/437 Biology and Identification of Woody

Plants, TA, fully responsible for two 5-hr field laboratory sections, taught 4 semesters.

Environmental Law Program (Vermont Law School) Watershed Management and Protection, TA developed and delivered field laboratory for a capstone course.

Maine Conservation School, Forest Ecology and Limnology, assisted in developing content, fully responsible for instruction to high-school and continuing education students

SERVICE TO THE DEPARTMENT, UNIVERSITY, COMMUNITY, and PROFESSION

SERVICE TO THE DEPARTMENT

2019-2020 Chair, Promotion & Tenure Committee (2)

2018-19 Human Geography Search Committee, GES, UMBC

2016-17 Chair, GIS/Geovisualization Search Committee, GES, UMBC

2015-2019 Undergraduate Committee, GES, UMBC

2015-2016 Graduate Committee, GES, UMBC

2015-2021 Graduate Program Director, MPS in GIS program

2012-present Junior Faculty Mentor

2011-present GES Promotion & Tenure Committee

2011-2019 Chair, GIS committee, GES, UMBC

2014-15 GIS Search Committee, GES, UMBC

2012-13 Chair, Biogeography Search Committee, GES, UMBC

2012-13 Human Geography Search Committee, GES, UMBC

2012-2013 Writing Across the Geography Curriculum committee, GES, UMBC

2010-2014 Graduate Committee, GES, UMBC

2010-11 Human Geography Search Committee, GES, UMBC

2009-2011 GIS Committee, GES, UMBC

2008-9 Environmental Policy Search Committee, GES, UMBC

2008-present Undergraduate Advisor, GES, UMBC

2008 Watershed Management Faculty Search Committee, WATS, USU

2008 Instructor of record, Graduate Student Seminar, GES, UMBC

2005-8 Undergraduate Advisor, Dept. of Watershed Sciences, USU

2005-8 Graduate Affairs Committee, Dept. of Watershed Sciences, USU

SERVICE TO THE UNIVERSITY

2019 Member, Search Committee, UMBC Athletic Director

- 2019-2020 Co-leader, Transfer Student Success Pilot, Office of the Provost
- 2017-2021 Faculty Athletic Representative to the NCAA, UMBC
- 2017-2021 Athletic Policy Committee, UMBC
- 2016-2017 Vice President, Faculty Senate, UMBC
- 2016-2017 Executive Committee, UMBC
- 2016-2017 Academic Planning & Budget Committee, UMBC
- 2016-2017 University Steering Committee, UMBC
- 2016-2017 Academic Programming and Budget Committee, UMBC
- 2015-2020 Co-Chair, Climate Action Steering Committee, UMBC
- 2015-2020 CERA steering committee, UMBC
- 2014-2018 ILSB Research Technical Advisory Committee, UMBC
- 2012-2016 Co-Chair, Course Evaluation Implementation Committee, UMBC
- 2012-2013 Executive Committee, UMBC
- 2012-2013 Chair, Faculty Affairs Committee, UMBC
- 2012 Faculty Development Center, Search Committee, UMBC
- 2011-14 iCubed Faculty Mentor
- 2011-2013 Faculty Affairs Committee, UMBC
- 2006-8 Chair, Information Technology Committee, College of Natural Resources, Utah State University
- 2000-1 Dean Search Committee, School of Natural Resources and Environment, U. of Michigan
- 1998-2001 Newcomb Tract Caretaker, School of Natural Resources & Environment, U. of Michigan
- 1997-9 Graduate Student Representative, School of Natural Resources & Environment, U. of Michigan
- 1997-8 Ecosystem Management Committee, , School of Natural Resources & Environment, U. of Michigan

SERVICE TO THE COMMUNITY

- 2020 Panelist, White River International Earth Day Film Festival
- 2020 Member, Science Advisory Council, The Nature Conservancy Upper Allegheny Flow Management Plan
- 2016-2018 Advisory Committee, Baltimore Green Network Plan
- 2014-2017 Technical Review Committee, Anne Arundel County Biological Monitoring and

Assessment Program

2012-present Advisor, Baltimore Greenspace

2001-08 Member, Science Advisory Council, The Nature Conservancy Emiquon Floodplain Restoration Project

2001-05 Member, Board of Directors. The Lake Michigan Federation (Now Alliance for the Great Lakes)

SERVICE TO THE PROFESSION

2019 Promotion & Tenure Review (University of Connecticut)

2018 Promotion & Tenure Review (Vassar College)

2018-present Associate Editor, Freshwater Science

2016 Promotion & Tenure review (University of Maryland, College Park)

2016 Promotion & Tenure review (University of Michigan)

2016-2017 Local Host, 2017 Annual Meeting, International Association of Landscape Ecology (IALE), U.S. Chapter

2015-2018 International Association of Landscape Ecology (IALE), U.S. Chapter: Executive Board

2015 Promotion & Tenure review (University of Maryland, Center for Environmental & Estuarine Science)

2014 Convening Co-Chair, Special Session: Modeling and mapping spatiotemporal patterns of stream biodiversity in the Chesapeake Bay watershed. Chesapeake Research Consortium Modeling Symposium, Annapolis, MD

2013 Promotion & Tenure review (Pennsylvania State University)

2010-2016 IALE, U.S. Chapter: Site Selection Committee

2010-2011 National Academy of Sciences, National Research Council, Challenges and Opportunities in the Hydrologic Sciences, Contributor

2009-10 National Science Foundation Doctoral Dissertation Improvement Grant Panel

2008-10 IALE, U.S. Chapter: Executive Board

2008-10 IALE, U.S. Chapter: Chair-Site Selection Committee

2006 Convening Chair, AGU Special Session: Interactions between Watershed Characteristics, Stream Dynamics, and Water Quality, Baltimore, MD

2005-08 American Geophysical Union, Water Quality Committee

2003-05 IALE, U.S. Chapter: Strategic Planning Review Committee

Ad Hoc Reviewer for:

American Fisheries Society; American Geophysical Union; Aquatic Ecology; Biological Conservation; Biological Invasions; CALFED Ecosystem Restoration Program; CALFED Science Program; Ecology; Chesapeake Bay Trust; Conservation Biology; Delaware SeaGrant; Ecography; Ecological Applications; Ecological Engineering; Ecological Indicators; Ecological Monographs; Ecological Restoration; Ecology; Ecosphere; Ecosystems; Environmental Management; Environmental Modeling & Software; Environmental Monitoring & Assessment; Environmental Reviews; Environmental Science: Processes & Impacts; Environmental Science & Technology; Fisheries Management & Ecology; Freshwater Biology; Freshwater Science; Geomorphology; Hydrobiologia; Hydrological Processes; International Journal of Applied Earth Observation and Geoinformation; International Journal of the Digital Earth; Journal of the American Water Resources Association; Journal of Applied Ecology; Journal of Applied Geography; Journal of Ecology; Journal of Environmental Management; Journal of Forestry; Journal of Hydrology; Journal of the North American Benthological Society (now Freshwater Science); Journal of Urban Ecology; Journal of Vegetation Science; Landscape Ecology; Limnology and Oceanography; Methods in Ecology & Evolution; Michigan SeaGrant; National Science Foundation; New Phytologist; Photogrammetric Engineering & Remote Sensing; PLoS One; Proceedings of the National Academy of Sciences; Restoration Ecology; Science of the Total Environment; Urban Forestry and Urban Greening; US Geological Survey; Water Research; Water Resources Research; Wetlands