

John Mallard

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Pacific Northwest Research Station
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Appointments

USFS Pacific Northwest Research Station ORISE Fellow	May 2022 – present
University of North Carolina Postdoctoral Fellow, Global Hydrology Lab	May 2020 – May 2022
Duke University Data Scientist, Watershed Hydrology and Biogeosciences Lab	Sep 2012 – Aug 2014

Education

Duke University Ph.D. - Earth and Ocean Sciences <i>Hydrologic Functioning of Low-Relief, Deep Soil Watersheds and Hydrologic Legacies of Intensive Agriculture in the Calhoun Critical Zone Observatory, South Carolina, USA</i>	2020
Montana State University M.S. - Land Resources and Environmental Sciences <i>The Role of Stream Network Hydrologic Turnover in Modifying Watershed Runoff Composition</i>	2012
University of North Carolina - Chapel Hill B.S. - Environmental Science Minor - Chemistry	2007

Publications (*Student mentored)

*Grande, E., M.A. Zimmer, **J.M. Mallard**. 2022. Storage variability controls seasonal runoff generation in catchments at the threshold between energy and water limitation. *Hydrological Processes*. <https://doi.org/10.1002/hyp.14697>

Seybold, E.C., M.L. Fork, A.E. Braswell, J.R. Blaszczak, M.R. Fuller, K.E. Kaiser, **J.M. Mallard**, M.A. Zimmer. 2021. A Classification Framework to Assess Ecological, Biogeochemical, and Hydrologic Synchrony and Asynchrony. *Ecosystems*. <https://doi.org/10.1007/s10021-021-00700-1>

Foroughi, M., **J.M. Mallard**, D.R. Nelson, L.A. Sutter, D. Markewitz. 2021. The impacts of historical land use on phosphorus movement in the Calhoun Critical Zone Observatory in the southeastern US Piedmont. *Biogeochemistry*. <https://doi.org/10.1007/s10533-021-00794-8>

Wlostowski, A.N., Molotch, S.P. Anderson, S. Brantley, J. Chorover, D. Dralle, P. Kumar, L. Li, K. A. Lohse, **J.M. Mallard**, J.C. McIntosh, S.F. Murphy, E. Parrish, M. Safeeq, C. Harman. 2021. Signatures of Hydrologic Function and Coevolution Across the Critical Zone Observatory Network. *Water Resources Research*. <https://doi.org/10.1029/2019WR026635>

Hodges, C.A., **J.M. Mallard**, D. Markewitz, D. Barcellos, A. Thompson. 2019. Seasonal and spatial variation in the potential for iron reduction in soils of the Southeastern Piedmont of the US. *Catena*. <https://doi.org/10.1016/j.catena.2019.03.026>

*Bergstrom, A.J., B.L. McGlynn, **J.M. Mallard**, T.P. Covino. 2016. Watershed structural influences on the distributions of stream network water and solute travel times under baseflow conditions. *Hydrological Processes*. <https://doi.org/10.1002/hyp.10792>

Mallard, J.M., B.L. McGlynn, T.P. Covino. 2014. Lateral inflows, stream-groundwater exchange, and network geometry influence streamwater composition. *Water Resources Research*. <https://doi.org/10.1002/2013WR014944>.

Covino, T.P., B.L. McGlynn, and **J.M. Mallard**. 2011. Stream – groundwater exchange and hydrologic turnover at the network scale. *Water Resources Research*. <https://doi.org/10.1029/2011WR010942>.

Publications - in review or in preparation

In review

Mallard, J.M., B.L. McGlynn, D.D. Richter, and M.A. Zimmer. Rapid, variable runoff generation and storage dynamics in a steep, deep, highly-weathered landscape. *In review at Water Resources Research*.

Mallard, J.M., Goldstein, E.B., T.M. Pavelsky, M.R.V. Ross, S.N. Topp. Seasonality of bank vegetation and riverine suspended sediment concentrations in global deltas. *In review at Geophysical Research Letters*.

In preparation

Braswell, A.E., **J.M. Mallard**, and M.R.V. Ross. Novel geomorphology: towards a systematic incorporation of humans into landscape process. *In preparation for JGR: Earth Surface*. Expected submission Q4 2022

Mallard, J.M., B.L. McGlynn, D.D. Richter, and M.A. Zimmer. Topographic and subsurface influences on runoff generation in a highly weathered system. *In preparation for Water Resources Research*. Expected submission Q1 2023

Tashie, A., M. Kumar, T.M. Pavelsky, **J.M. Mallard**. Combined and relative effects of thawing permafrost and changing hydroclimate on baseflow across high latitudes. *In preparation for Geophysical Research Letters*. Expected submission Q1 2023

Mallard, J.M., B.L. McGlynn, and D.D. Richter. Hydrologic connectivity across stream orders in an anthropogenically modified landscape. *In preparation for Water Resources Research*. Expected Submission Q2 2023

Velez, J.D., T.M. Pavelsky, **J.M. Mallard**. A ground-truthed comparison of spectral indices for determination of suspended sediment concentrations across the conterminous United States. *In preparation for Remote Sensing Letters*. Expected Submission Q3 2023

Datasets

Christensen, A.L., **J.M. Mallard**, J. Nghiem, J. Harringmeyer, M. Simard, T.M. Pavelsky, M.P. Lamb, and C.G. Fichot. 2022. Delta-X: Sonar Bathymetry Survey of Channels, MRD, Louisiana, 2021. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/2085>

Christensen, A.L., **J.M. Mallard**, M. Simard, T.M. Pavelsky, and A. Rovai. 2022. Delta-X: In-situ Water Surface Elevation, MRD, Louisiana, USA, 2021. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/2086>

Christensen, A.L., **J.M. Mallard**, and J. Nghiem. 2021. Delta-X: Acoustic Doppler Current Profiler Channel Surveys, Coastal Louisiana, 2021. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1939>

Honors and Funding

Invited Seminar Speaker – Duke Earth and Ocean Sciences Fall Seminar	2021
Duke Information Initiative – Data Expedition Teaching Award (\$1,500) Visualizing virtual water and international trade	2017
Duke Information Initiative – Data Expedition Teaching Award (\$1,500) Introduction to data analysis using scientific programming languages	2016
Outstanding Student Presentation – EGU Annual Meeting	2016
NSF IGERT Wireless Intelligent Sensor Networks (WiSeNet) (\$106,000)	2014-2017
CUAHSI Instrument Discovery Travel Grant (\$1,200)	2015
2nd Place Student Oral Presentation – Montana AWRA annual meeting	2011
Outstanding Student Presentation – AGU Annual Meeting	2010

Teaching

Instructor of Record

Dynamic Earth (Eos 101, Duke)	Summer 2019
Dynamic Earth (Eos 101, Duke)	Summer 2018

Teaching Assistant

Landscape Hydrology (Eos 723, Duke)	Fall 2019
Dynamic Earth (Eos 101, Duke)	Spring 2019
Landscape Hydrology (Eos 723, Duke)	Fall 2018
Mountain Ecohydrology field course (MSU)	Summer 2011
Mountain Ecohydrology field course (MSU)	Summer 2010
Watershed Hydrology (LRES 444, MSU)	Fall 2010

Sessions Convened

Christensen, A.L., O. Gourgue, **J.M. Mallard**, A.E. Braswell, E. Solohin. Predicting the Fate of River Deltas and Coastal Wetlands: Remote Sensing, Numerical Modeling, and Field Advances. *2022 AGU General Assembly*.

Barclay, J.R., **J.M. Mallard**, K.J. Van Meter, M.A. Zimmer. Terrestrial-Aquatic Linkages in the Context of Land Use/Land Cover Change: Contemporary and Legacy Effects on Physical and Biogeochemical River Processes. *2017 AGU General Assembly*.

Heidbüchel, I., T. Schuetz, J. Klaus, C. Birkel, C. Gascual-Odoux, **J.M. Mallard**. Controls on non-stationary catchment response and spatial water quality dynamics. *2017 EGU General Assembly*.

Heidbüchel, I., T. Schuetz, J. Klaus, C. Birkel, C. Gascual-Odoux, **J.M. Mallard**, Y. van der Velde. Controls on non-stationary catchment response and spatial water quality dynamics. *2016 EGU General Assembly*.

Selected Presentations (*) Undergraduate student mentored

Braswell, A.E., **J.M. Mallard**, and M.R.V. Ross. Novel Landforms: Towards a systematic incorporation of people into geomorphology. *2022 AGU General Assembly. Chicago, IL. Oral.*

Braswell, A.E., **J.M. Mallard**, and M.R.V. Ross. Novel Landforms: integrating humans as key drivers of process and form in geomorphology. 2022 Joint Aquatic Sciences Meeting. *Grand Rapids, MI*. Oral.

Mallard, J.M., T.M. Pavelsky, E.B. Goldstein, S.N. Topp, M.R.V. Ross. Seasonality and asynchrony of bank vegetation and riverine suspended sediment concentrations in global deltas. 2021 AGU General Assembly. *New Orleans, LA*. Oral.

Mallard, J.M., E. Grande, M.A. Zimmer. Catchment storage state controls event-scale runoff generation in catchments at the threshold between water- and energy-limitation. 2021 AGU General Assembly. *New Orleans, LA*. Oral.

Grande, E., M.A. Zimmer, and **J.M. Mallard**. 2020. Dynamic catchment water storage-discharge partitioning across water and energy-limited catchments. 2020 AGU General Assembly.

Mallard, J.M., B.L. McGlynn, and D.D. Richter. 2019. Storage volume and depth drives runoff generation in a deep and highly weathered headwater watershed. 2019 AGU General Assembly. *San Francisco, CA*. Oral.

Mallard, J.M., B.L. McGlynn, D.D. Richter, and M.A. Zimmer. 2019 The Calhoun Critical Zone Observatory: historic hydrologic research in a complex socio-environmental context reinvigorated and expanded by critical zone science. 2019 AGU General Assembly. *San Francisco, CA*.

Mallard, J.M., B.L. McGlynn, and D.D. Richter. 2018. Critical zone structural influences on runoff generation in a steep, deep, watershed. CUAHSI 2018 Biennial Colloquium. *Shepardstown, WV*

Mallard, J.M., B.L. McGlynn, and D.D. Richter. 2017. Terrain and subsurface influences on runoff generation in a highly weathered system. 2017 AGU General Assembly. *New Orleans, LA*

Mallard, J.M., B.L. McGlynn, D.deB. Richter. 2017. Subsurface and terrain controls on runoff generation in deep soil landscapes. Geophysical Research Abstracts. Vol. 19, EGU2017-18502, 2017 EGU General Assembly 2017. *Vienna, Austria*.

Mallard J.M., B.L. McGlynn, D.deB. Richter. 2016. Subsurface and terrain controls on runoff generation in deep soil landscapes. Eos Trans. AGU, Fall Meet. Suppl., Abstract H53F-1765. *San Francisco, CA*.

Mallard, J.M., B.L. McGlynn, T.P. Covino. 2016. Hydrologic and biologic influences on stream network nutrient concentrations: Interactions of hydrologic turnover and concentration-dependent nutrient uptake. Geophysical Research Abstracts. Vol. 18, EGU2016-17630, 2016 EGU General Assembly. *Vienna, Austria*. [STUDENT PAPER AWARD]

Mallard, J.M., B.L. McGlynn, D.D. Richter, G.S. Hancock. 2014. The Calhoun Critical Zone Observatory: understanding the evolution of the critical zone after centuries of anthropogenic degradation. *Eos Trans. AGU, Fall Meet. Suppl., Abstract H43D-0983. San Francisco, CA.*

Mallard, J.M., B.L. McGlynn, D. Richter, D. Markewitz, Z. Brecheisen. 2014. Calhoun CZO: understanding critical zone evolution after a legacy of degradation. CUAHSI 2014 Biennial Colloquium. *Shepardstown, WV.*

Brecheisen, Z.R., **J.M. Mallard**, N.F. Pelak. 2014. Optimizing Hydrologic and Biogeochemical Sensor Networks in the Calhoun Critical Zone Observatory. 2nd Annual Workshop on Wireless Intelligent Sensor Networks. *Durham, NC. Oral.*

Mallard, J.M., B.L. McGlynn, T.P. Covino, A.J. Bergstrom. 2013. The combined influence of stream network scale physical and biogeochemical processes on in-stream nutrient concentrations. Montana Chapter of the American Water Resources Association Annual Meeting. *Bozeman, MT. Oral.*

Broer, M., K.G. Jencso, B.L. McGlynn, **J.M. Mallard**, S. Carlson, and G. Bloeschl. 2012. Spatio-temporal controls on diurnal streamflow fluctuations. Section: Hydrology. *Eos Trans. AGU, Fall Meet. Suppl., Abstract. San Francisco, CA.*

Mallard, J.M., B.L. McGlynn, T.P. Covino, and A.J. Bergstrom. 2012. Hydrologic and biologic influences on stream network nutrient concentrations: Interactions of hydrologic turnover and concentration-dependent nutrient uptake. Section: Biogeosciences. *Eos Trans. AGU, Fall Meet. San Francisco, CA.*

McGlynn, B.L., K.G. Jencso, F. Nippgen, S. Carlson, **J.M. Mallard**, T.P. Covino, R.E. Emanuel, L. Marshall, M. Gooseff, K. Bencala, and S. Wondzell. Climate & watershed structure effects on hydrologic connectivity & stream network influences on watershed signatures. Woo Lecture. Canadian Geophysical Union. 2012. *Banff, Canada. [INVITED].*

Mallard, J.M., B.L. McGlynn, and T.P. Covino. 2012. Hydrologic and biologic controls on instream nutrient concentration: interactions of hydrologic turnover with concentration dependent nutrient uptake. Canadian Geophysical Union Annual Meeting, Banff, Canada. *Banff, Canada.*

*Bergstrom, A.J., **J.M. Mallard**, B.L. McGlynn, and T.P. Covino. 2012. Stream network travel times: The combined influences of watershed and stream network geometries. Canadian Geophysical Union Annual Meeting, Banff, Canada. *Banff, Canada.*

Mallard, J.M., T.P. Covino, and B.L. McGlynn. 2011. Watershed structure, stream network geometry, and kinetic influences on instream nutrient retention. *Eos Trans. AGU, Fall Meet. Suppl., Abstract B13G-0650. Oral. San Francisco, CA.*

*Bergstrom, A.J., B.L. McGlynn, **J.M. Mallard**, and T.P. Covino. 2011. Stream network travel times: Influence of watershed structure and network geometry. *Eos Trans. AGU, Fall Meet. Suppl.*, Abstract H41E-1085. *San Francisco, CA*.

*Kaiser, K., B.L. McGlynn, R.E. Emanuel, F. Nippgen, and **J.M. Mallard**. 2011. Ecohydrology of an outbreak: Impacts of vegetation pattern and landscape structure on mountain pine beetle disturbance. *Eos Trans. AGU, Fall Meet. Suppl.*, Abstract B33B-0455. *San Francisco, CA*.

McGlynn, B.L., K.G. Jencso, D. Riveros-Iregui, R.E. Emanuel, T.P. Covino, and **J.M. Mallard**. 2011. Expanding Dimensions in Hydrologic Sciences. University of Colorado Hydrological Sciences Symposium. *Boulder, CO*. [INVITED KEYNOTE].

Mallard, J.M., T.P. Covino, and B.L. McGlynn. 2011. Instream nutrient concentrations: How groundwater/stream water exchange and nutrient uptake can interact in stream networks. Montana Chapter of the American Water Resources Association Annual Meeting. *Great Falls, MT*. [2nd PLACE STUDENT ORAL PRESENTATION AWARD]

Covino, T.P., **J.M. Mallard**, and B.L. McGlynn. 2011. Stream - groundwater exchange and hydrologic turnover at the network scale. Montana Chapter of the American Water Resources Association Annual Meeting. *Great Falls, MT*. [1st PLACE STUDENT ORAL PRESENTATION AWARD]

*Bergstrom, A.J., **J.M. Mallard**, B.L. McGlynn, and T.P. Covino. 2011. Watershed structure and stream network geometry: Implications for water and solute transport. Montana Chapter of the American Water Resources Association Annual Meeting. *Great Falls, MT*.

Covino, T.P., B.L. McGlynn, and **J.M. Mallard**. 2011. Measuring and modeling nutrient uptake kinetics from ambient to saturation across a stream network: Implications for watershed scale nitrogen export. North American Benthological Society Annual Meeting. NABS 2011. *Providence, RI*.

McGlynn, B.L., K.G. Jencso, D. Riveros-Iregui, R.E. Emanuel, T.P. Covino, and **J.M. Mallard**. 2011. Process interactions and synthesis in catchment hydrology. Vienna Catchment Sciences Symposium, *Vienna Austria*. [INVITED KEYNOTE].

*Kaiser, K., B.L. McGlynn, R.E. Emanuel, F. Nippgen, and **J.M. Mallard**. 2011. Ecohydrology: Disturbance and the intersection of vegetation pattern and landscape structure. *Geophysical Research Abstracts Vol. 13, EGU2011-9612*, 2011 EGU General Assembly. *Vienna, Austria*. [STUDENT PAPER AWARD]

*Bergstrom, A.J., **J.M. Mallard**, B. McGlynn. 2011. Watershed and stream network geometry: Implications for water and solute fluxes from watersheds. European Geophysical Union Annual Meeting. *Geophysical Research Abstracts Vol. 13, EGU2011-9635*, 2011 EGU General Assembly. *Vienna, Austria*.

Covino, T.P., B.L. McGlynn, and **J.M. Mallard**. 2011. Hydrologic gains and losses, fractional turnover, and stream network controls on streamwater composition. European Geophysical Union Annual Meeting. Spring, 2011. Geophysical Research Abstracts. EGU General Assembly. *Vienna, Austria*.

Mallard, J.M., T.P. Covino, B.L. McGlynn, and A.J. Bergstrom. 2011. Watershed and stream network structure influences on physical and biological nutrient retention and stream water sources. Geophysical Research Abstracts Vol. 13, EGU2011-12910, 2011 EGU General Assembly. *Vienna, Austria*.

Mallard, J.M., T.P. Covino, B.L. McGlynn, 2010. The role of stream network complexity in hydrologic turnover, nutrient retention, and watershed outlet signatures. Eos Trans. AGU, Fall Meet. Suppl., Abstract H21C-1060. *San Francisco, CA*. [STUDENT PAPER AWARD]

Covino, T.P., B.L. McGlynn, and **J.M. Mallard**. 2010. Implications of stream gains and losses for hydrologic turnover and solute retention / transport at the stream network scale. Eos Trans. AGU, Fall Meet. Suppl., Abstract H32C-02. *San Francisco, CA*.