Matthew R.V. Ross

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Education

Duke University, Ph.D. Ecology 2017

University of Colorado at Boulder, B.A. Ecology and Evolutionary Biology with a Minor in French 2010

Employment

Colorado State University Department of Ecosystem Science and Sustainability

Assistant Professor of water quality 2018–present

University of North Carolina at Chapel Hill

Post-doctoral researcher in the Global Hydrology Lab with Tamlin Pavelsky 2017–2018

Peer-Reviewed Publications

Publications in review

J Gardner, **MRV Ross**, S Topp, X Yang, T Pavelsky. *The color of rivers: Are US rivers "greening" or "browning"?*

S Topp, T Pavelsky, E Stanley, X Yang, C Griffin, **MRV Ross** *Regional Increases in U.S. Lake Water Clarity Over 35 Years*

M Simonin, JD Rocca, J Gerson, E Moore, **MRV Ross**, A Brooks, J Craine, L Czaplicki N Fierer ES Bernhardt. *Biodiversity loss across multiple kingdoms of life associated with surface coal mining activities in Central Appalachian rivers.*

K Jaeger, **MRV Ross**. *Process domains in synthetic landscapes: uncoupling of geomorphic process and form in the mountaintop mining region of West Virginia, USA*

A Eurich, SK Kampf, JC Hammond, **MRV Ross**, K Willi. *Predicting mean annual and mean monthly streamflow in Colorado ungauged basins.*

Publications in prep (Draft available upon request)

MRV Ross *Cumulative mining impacts in Appalachia from 1984-2015 and a generalized method for accumulating disturbance in a river network.*

MRV Ross, F Nippgen, BL McGlynn, A Brooks, C Thomas, ES Bernhardt. *Past the point of no return? ecosystem trajectories in mined landscapes*.

AE Braswell, JM Mallard, **MRV Ross**. *Novel geomorphology: Towards a systematic incorporation of people into geomorphology*

J Diamond, G Pinay, F Moatar, MC Cohen, J Gardner, **MRV Ross** *Cascading downstream transition from pelagic- to benthic- dominated primary production in the Loire River*

NE Bruns, MW Doyle, **MRV Ross.** *Stable phytoplankton accumulation in a Plains river creates biotic standing waves*

C Thomas, M Wasson, J Amos, **MRV Ross**. *Of equal or greater value? long-term vegetation response to mountaintop mining*

2020

S Topp, T Pavelsky, D Jensen, M Simard. **MRV Ross**. *Remote sensing of water quality: a 50-year review of methods and applications.* Water. 2020. DOI: 10.3390/w12010169

GH Allen, X Yang, J Gardner, J Holliman, CH David, **MRV Ross**. *Timing of Landsat Overpasses Effectively Captures Flow Conditions of Large Rivers* Remote Sensing. 2020. DOI: 10.3390/rs12091510

A Whittermore, **MRV Ross**, X Yang, W Dolan, T Langhorst, T Pavelsky, S Januchowski-Hartley. *The construction and validation of a citizen science derived Global River Obstruction Database (GROD).* Earth's Future. In Press

JR Gerson, LC Naslund, H Hsu-Kim, CT Driscoll, **MRV Ross**, M Waters, ES Bernhardt. *Mercury and Selenium Loading in Mountain-Top Mining Impacted Alkaline Streams and Riparian Food Webs.* Biogeochemistry. 2020 DOI: 10.1007/s10533-020-00690-7

2019

AC Brooks, **MRV Ross**, F Nippgen, BL McGlynn, ES Bernhardt. *Mountaintop removal coal mining watersheds export excessive nitrate.* Journal of Geophysical Research: Biogeosciences. 2019. DOI: 10.1029/2019JG005174

MRV Ross, S Topp, AP Appling, C Kuhn, D Butman, M Simard, T Pavelsky. *AquaSat: a dataset to enable remote sensing of water quality for inland waters*. Water Resources Research. 2019. DOI: 10.1029/2019WR024883

2018

Barger, N. N., Gardner, T. A., Sankaran, M., Belnap, J., Broadhurst, L., Brochier, V., Isbell, F., Meyfroidt, P., Moreira, F., Nieminen, T. M., Okuro, T., Rodrgiues, R. R., Saxena, V., and **Ross, M**. *Chapter 3: Direct and indirect drivers of land degradation and restoration*. In IPBES (2018): The IPBES assessment report on land degradation and restoration. Montanarella, L., Scholes, R., and Brainich, A. (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany, pp. 137-218

MRV Ross, F Nippgen, BA Hassett, BL McGlynn, ES Bernhardt. *Pyrite oxidation drives exceptionally high weathering rates and geologic CO_2 release in mountaintop-mined landscapes*. Global Biogeochemical Cycles. 2018. doi: 10.1029/2017GB005798

AA Periçak CJ Thomas, DA Kroodsma, MF Wasson, **MRV Ross**, NE Clinton, DJ Campagna, Y Franklin, ES Bernhardt, JF Amos. *Mapping the yearly extent of surface coal mining in Central Appalachia using Landsat and Google Earth Engine*. PLOS ONE. 2018. doi: 10.1371/journal.pone.0197758

2017

F Nippgen, **MRV Ross**, ES Bernhardt, BL McGlynn. *Creating a more perennial problem? Mountaintop removal coal mining enhances and sustains sailine baseflows of Appalachian watersheds*. Environmental science & technology. 2017. doi: 10.1021/acs.est.7b02288

2016

MRV Ross, BL McGlynn, ES Bernhardt. *Deep impact: effects of mountaintop mining on surface topography, bedrock structure, and downstream waters*. 2016. Environmental science & technology. doi: 10.1021/acs.est.5b04532
*Covered in NYTimes, The Atlantic, and Think Progress

2015

MRV Ross, ES Bernhardt, MW Doyle, JB Heffernan. *Designer ecosystems: incorporating design approaches into applied ecology*. 2015. Annual Reviews of Environment and Resources. doi: 10.1146/annurev-environ-121012-100957

MC Arnold, LA Friedrich, TT Lindberg, **MRV Ross**, NM Halden, ES Bernhardt, VP Palace, RT Di Giullio. *Microchemical analysis of selenium in otoliths of two West Virginia fishes captured near mountaintop removal coal mining operations*. 2015. Environmental Toxicology and Chemistry. doi: 10.1002/etc.2885

2012

MR Ross, SC Castle, NN Barger. *Effects of fuels reductions on plant communities and soils in a Pi~non Juniper woodland*. 2012. Journal of arid environments. doi: 10.1016/j.jaridenv.2011.11.019

Grants and Awards

Pending

NASA New Investigator Program, PI. *Towards robust, reproducible, and open global remote sensing of water quality* ($391,000)

NASA Citizen Science for Earth Systems Program, PI. *Stream Tracker: Extending a citizen science field record with remote sensing* ($159,000)

NASA Carbon Monitoring System Program, CO-PI. *Forecasting and monitoring of woodland carbon dynamics based on remotely-sensed tree demography* (Total: $750,000 with University of Nevada, Reno, CSU Portion: $325,000)

NSF Hydological Sciences, PI. *Collaborative Research: Clear, Stained, Muddy, and Green: Water clarity patterns and processes across inland water networks.* (Total: $785,000 with University of Florida, CSU Portion: $345,000)

Awarded

2020

NSF Hydrological Sciences RAPID Award, CSU PI. *Collaborative Research: Increased access to infrastructure for distance education in hydrologic science* $20,552

Colorado State University Provost Office, PI. *University-wide training in foundational data-analysis software* $19,996

Colorado Water Institute, PI. *Linking the topology of forest disturbance to water quality to enhance forest and water resource management in Colorado* ($49,970)

2019

NSF DEB Macrosystems and NEON-Enabled Science, CO-PI. *Collaborative Research: MACRO-Sheds: Comparative Ecosystem Biogeochemistry at Continental Scales* (Total: $997,000 with Duke University, CSU Portion: $420,864)

USDA National Need Fellowship program, CO-PI. *Re-visioning graduate training for the era of agricultural big data*. Support for 4 Master's and 1 PhD student to get ag or watershed data science degrees ($243,500)

NSF EAR Hydrological Sciences Post-DOC awarded directly to Anna Bergstrom. *Controls on weathering, solute fluxes, and geologic carbon cycling in glacierized catchments* Faculty adviser for post-doc ($174,000).

Wyoming Water Research Program. Identifying, predicting and managing the occurrence of harmful cyanobacterial blooms in Wyoming reservoirs (CSU portion $25,200)

2018

Partnership with the City of Fort Collins and In-Situ Sensor Manufacturing for a real-time water quality monitoring and decision network in the Poudre River (Estimated in-kind contribution from the City and In-Situ: $85,000)

Colorado Water Institute, PI. *Tools for improving knowledge of reservoir water quality in the Front Range of Colorado* ($49,991)

2016

Grand Prize AGU/NASA Data Visualization and Storytelling Competition

Fellow for Intergovernmental Panel on Biodiversity and Ecosystem Assessment

Finalist for Mozilla Fellowship for Open Science

2015

Gordon Research Conference Rising Star Award ($2500)

2013

NSF Graduate Research Fellowship NSF IGERT For Wireless Intelligent sensors

Recent unfunded proposals

Google Artificial Intelligence Impact Challenge, Lead PI. Using AI, Satellites, and Geoscience Knowledge to Build a Global Water Quality Monitoring Network ($2 million)

NSF Frontiers in Earth Science, CO-PI. Using big data and machine learning to understand the phasing and processes that link upland sediment sources to coastal wetland change (My lab portion: $780,000)

NASA Carbon Monitoring System, CO-PI. RDOM-CMPS: Riverine Dissolved Organic Matter Monitoring and Prediction using big data, machine learning, and next generation sensing. (CSU Portion: 350,000)

Selected First-Author Presentations (2016-2020)

2020

MRV Ross *Matched-up, the importance of open-access training data for global-scale remote sensing of water quality* Invited speaker to the Workshop on Knowledge Guided Machine Learning at University of Minnesota. 2020

MRV Ross *From printing press to pdfs, the limits of papers in scholarly communication and open science* Invited speaker to Virtual Summit on Incorporating Data Science and Open Science Techniques in Aquatic Research. 2020

SN Topp, TM Pavelsky, EH Stanley, X Yang, CG Griffin, **MRV Ross.** *Multi-Decadal Increases in U.S. Lake Water Clarity* Invited Talk at Ecological Society of America Virtual Conference. 2020.

2019

J Gardner, **MRV Ross**, SN Topp, X Yang, TM Pavelsky. *Trends and patterns in riverine suspended sediment concentrations across the continental USA revealed by satellite remote sensing.*

X Yang, M Belanger, DK Byron, W Dolana, H Galit, S Januchowski-Hartley, M Jorrisen, T Langhorst, E Lawton, KA McQuillan, T Pavelsky, S Pawar, **MRV** Ross, A Whittemore. *Our fragmented rivers—-mapping human-made river obstructions around the globe.*

SN Topp, TM Pavelsky, **MRV Ross.**, EH Stanley, X Yang. *Lakes as integrators: Multi-decadal fluctuations in regional lake water clarity and seasonality across the U.S.*

T Langhorst, TM Pavelsky, SN Topp, **MRV Ross**, C Dai, MT Durand, RPM Frasson, I Howat. *Remotely sensed discharge and sediment flux of the Sagavanirktok River.*

2018

MRV Ross, SN Topp, AP Appling, X Yang, J Gardner, T Pavelsky. *What can 34 years of imagery tell us about suspended sediment dynamics and controls in large rivers?* Fall Meeting of the American Geophysical Union, Washington DC, December 2018.

MRV Ross. *The ecology of a designed ecosystem: legacies in the man-made mountains of Appalachia.* Invited speaker to CU-Boulder Ecology Symposium, 2018.

MRV Ross. *Novel approaches to understanding spatial and temporal variation in water quality*. Invited speaker to CU-Boulder Civil and Environmental Engineering Symposium. 2018

2017

MRV Ross, F Nippgen, BL McGlynn, ES Bernhardt.*Yesterdays forest, tomorrows savannah? Legacies in the man-made mountains of Appalachia*. Fall Meeting of the American Geophysical Union, New Orleans, December 2017. *Invited

MRV Ross. *Designer ecosystems on federal lands*. Invited talk at USGS Grand Canyon Monitoring and Research Center, Flagstaff AZ, 2017.

MRV Ross, F Nippgen, BL McGlynn, ES Bernhardt. *Disturb 1% of the land, generate 50% of the regional ion flux*. Society for Freshwater Science, Raleigh, June, 2017.

MRV Ross, F Nippgen, BL McGlynn, ES Bernhardt. *Tracing disturbance impacts on water quantity and quality through a stream network*. European Geophysical Union, Vienna, April, 2017

Other Products

Educational resources

Open access book for learning R, mostly built by Alex Fout as part of our CSU-wide initiative. Book

Open access website, videos, and tutorials for learning environmental data science under construction

Open access book on water quality also under construction

Website to explore the topographic impacts of Mountaintop Mining

Application to explore chemistry and weathering changes in mountaintop mined watersheds

Introduction to environmental science course material as an interactive series of web applications

Application to look at water quality change in the Blue River Watershed

Site to explore Hubbard Brook ecosystem biogeochemistry data

Additional publications

Publication in the conversation on hard rock mining, over 10,000 readers.

Grimbert, Pierre., *The Secret of Ji: The Shadow of the Ancients*. Translated by Matt Ross. Amazon Crossing, Seattle, 2014

Grimbert, Pierre., *The Secret of Ji: The Orphan's Promise*. Translated by Matt Ross and Eric Lamb. Amazon Crossing, Seattle, 2013

Grimbert, Pierre., *The Secret of Ji: The Six Heirs*. Translated by Matt Ross and Eric Lamb. Amazon Crossing, Seattle, 2012.