DAVID M. COSTELLO
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EDUCATION

University of Notre Dame (ND)	PhD, 2009, Biological Sciences Dissertation: *Effects of invasive species and chemical stressors on biogeochemical fluxes across ecosystem boundaries* Advisor: Gary A. Lamberti
Hobart College	BS, 2004, Biology (magna cum laude, with honors) Honors thesis: *The reproductive effects of four potential estrogen mimics on* Ceriodaphnia dubia

PROFESSIONAL POSITIONS

Associate Professor	2020–present, Department of Biological Sciences, Kent State University (KSU)
Assistant Professor	2014–2020, Department of Biological Sciences, KSU
Assistant Research Scientist	2013, School of Natural Resources & Environment (SNRE), University of Michigan
Lecturer	2011–2013, SNRE, University of Michigan
Research Fellow	2009–2012, Cooperative Institute for Limnology and Ecosystem Research. Advisor: G. Allen Burton

RESEARCH INTERESTS

Biogeochemistry, ecotoxicology, trace metals, ecosystem ecology, environmental chemistry, periphyton, invasive species, earthworm ecology, aquatic ecology, riparian ecology

PUBLICATIONS (* indicates a student-coauthor)

26. **Costello, DM**, EW Hartung*, JT Stoll*, and AJ Jefferson. 2020. Bioretention cell age and construction style influence stormwater pollutant dynamics. *Science of the Total Environment.* 10.1016/j.scitotenv.2019.135597

25. **Costello, DM**, AM Harrison*, CR Hammerschmidt, RM Mendonca*, and GA Burton. 2019. Hitting reset on sediment toxicity: Sediment homogenization alters the toxicity of metal-amended sediments. *Environmental Toxicology and Chemistry* 38(9): 1995–2007. 10.1002/etc.4512 Awarded 2019 *ET&C* Exceptional Paper 10.1002/etc.4754.

24. Hudson, ML*, **DM Costello**, JM Daley, and GA Burton. 2019. Species-specific (*Hyalella azteca* and *Lymnaea stagnalis*) dietary accumulation of gold nano-particles associated with periphyton. *Bulletin of Environmental Contamination and Toxicology.* 10.1007/s00128-019-02620-2

23. Tiegs, SD, **DM Costello**, MW Isken, G Woodward, PB McIntyre, MO Gessner, E Chauvet, NA Griffiths, AS Flecker and 143 coauthors. 2019. Global patterns and drivers of ecosystem functioning in rivers and riparian zones. *Science Advances* 5: eaav0486. DOI: 10.1126/sciadv.aav0486

22. **Costello, DM**, KJ Kulacki, ME McCarthy*, SD Tiegs, and BJ Cardinale. 2018. Ranking stressor impacts on periphyton structure and function with mesocosm experiments and environmental change forecasts. *PLoS ONE*: 13(9): e0204510. DOI: 10.1371/journal.pone.0204510

21. Mendonca, RM*, JM Daley, ML Hudson, CE Schlekat, GA Burton, and **DM Costello**. 2017. Metal oxides in surface sediment control nickel bioavailability to benthic macroinvertebrates. *Environmental Science and Technology* 51: 13407–13416. DOI: 10.1021/acs.est.7b03718

20. Kinsman-Costello, LE, CS Sheik, ND Sheldon, GA Burton, **DM Costello**, D Marcus, P Den Uyl*, and GJ Dick. 2017. Groundwater shapes sediment biogeochemistry and microbial diversity in a submerged Great Lake sinkhole. *Geobiology* 15(2): 225–239. DOI: 10.1111/gbi.12215

19. **Costello, DM**, EJ Rosi-Marshall, LE Shaw, MR Grace, and JJ Kelly. 2016. A novel method to assess the effects of chemical stressors on natural biofilm structure and function. *Freshwater Biology* 61: 2129–2140. DOI: 10.1111/fwb.12641

18. **Costello, DM**, CR Hammerschmidt, and GA Burton. 2016. Nickel partitioning and toxicity in sediment during aging: variation in toxicity is related to the stability of metal partitioning. *Environmental Science & Technology* 50: 11337–11345. DOI: 10.1021/acs.est.6b04033

17. Klaus, JE*, CR Hammerschmidt, **DM Costello**, and GA Burton. 2016. Net methylmercury production in two contrasting stream sediments and associated accumulation and toxicity to periphyton. *Environmental Toxicology & Chemistry* 35(7): 1759-765. DOI: 10.1002/etc.3324

16. Fetters, KJ*, **DM Costello**, CR Hammerschmidt, and GA Burton. 2016. Toxicological effects of short-term resuspension of metal-contaminated freshwater and marine sediments. *Environmental Toxicology & Chemistry* 35(3): 676–686. DOI: 10.1002/etc.3225

15. Danner, KM*, CR Hammerschmidt, **DM Costello**, and GA Burton. 2015. Copper and nickel partitioning with nanoscale goethite under variable aquatic conditions. *Environmental Toxicology & Chemistry* 34(8): 1705–1710. DOI: 10.1002/etc.2977

14. Gamby, RL*, CR Hammerschmidt, **DM Costello**, CH Lamborg, and JR Runkle. 2015. Deforestation and cultivation mobilize mercury from topsoil. *Science of the Total Environment* 532: 467–473. 10.1016/j.scitotenv.2015.06.025

13. **Costello, DM**, CR Hammerschmidt, and GA Burton. 2015. Copper sediment toxicity and partitioning during oxidation in a flow-through flume. *Environmental Science & Technology* 49(11): 6926–6933. DOI: 10.1021/acs.est.5b00147

12. **Costello, DM** and GA Burton. 2014. Response of stream ecosystem function and structure to sediment metal: Context dependency and variation among endpoints. *Elementa* 2:000030. DOI: 10.12952/journal.elementa.000030

11. **Costello, DM** and MJ Michel. 2013. Predator-induced defenses in tadpoles confound body stoichiometry predictions of the general stress paradigm. *Ecology* 94(10): 2229–2236. DOI: 10.1890/12-2251.1

10. **Costello, DM**, GA Burton, CR Hammerschmidt, and WK Taulbee. 2012. Evaluating the performance of diffusive gradients in thin films (DGTs) for predicting Ni sediment toxicity. *Environmental Science & Technology* 46(18):10239–10246. DOI: 10.1021/es302390m

9. Li, M*, **DM Costello**, and GA Burton. 2012. Interactive effects of phosphorus and copper on *Hyalella azteca* and periphyton. *Ecotoxicology and Environmental Safety* 83: 41-46. DOI: 10.1016/j.ecoenv.2012.06.004

8. **Costello, DM**, GA Burton Jr., CR Hammerschmidt, EC Rogevich, and CE Schlekat. 2011. Nickel phase partitioning and toxicity in field deployed sediments. *Environmental Science & Technology* 45(13): 5798–5805. DOI: 10.1021/es104373h

7. Kulacki, K.J. DT Chaloner, JH Larson, **DM Costello**, MA Evans-White, KM Docherty, RJ Bernot, MA Brueseke, CF Kulpa Jr., and GA Lamberti. 2011. Proactive aquatic ecotoxicological assessment of room-temperature ionic liquids. *Current Organic Chemistry* 15(12): 1918–1927.

6. **Costello, DM**, SD Tiegs, and GA Lamberti. 2011. Do non-native earthworms in Southeast Alaska use streams as invasional corridors in watersheds harvested for timber? *Biological Invasions* 13(1): 177–187. DOI: 10.1007/s10530-010-9800-1

5. Greiner, HG*, **DM Costello**, and SD Tiegs. 2010. Allometric estimation of earthworm ash-free dry mass from diameters and lengths of select Megascolecid and Lumbricid species. *Pedobiologia* 53: 247–252.

4. **Costello, DM** and GA Lamberti. 2009. Biological and physical effects of non-native earthworms on nitrogen cycling in riparian soils. *Soil Biology & Biochemistry* 41(10): 2230–2235. DOI: 10.1016/j.soilbio.2009.08.007

3. **Costello, DM**, LM Brown*, and GA Lamberti. 2009. Acute toxic effects of ionic liquids on zebra mussel (*Dreissena polymorpha*) survival and feeding. *Green Chemistry* 11(4): 548–553. Featured in *Chemical Science* 6(4):C26

2. **Costello, DM** and GA Lamberti. 2008. Non-native earthworms in riparian soils increase nitrogen flux into adjacent aquatic ecosystems. *Oecologia* 158(3): 499–510. DOI: 10.1007/s00442-008-1149-0

1. Kulacki, KJ, DT Chaloner, **DM Costello**, KM Docherty, JH Larson, MA Brueseke, RJ Bernot, CF Kulpa Jr., GA Lamberti. 2007. Aquatic toxicity and biodegradation of ionic liquids: A synthesis. *Chemistry Today* 25(6): 32–36.

NON-PEER REVIEWED PUBLICATIONS

Burton, GA, R Di Giulio, **DM Costello**, and JR Rohr. 2017. Slipping through the cracks: Why is the U.S. Environmental Protection Agency not funding extramural research on chemicals in our environment? *Environmental Science & Technology* 51: 755–756. DOI: 10.1021/acs.est.6b05877

RESEARCH GRANTS

CAREER: Beyond N and P: How trace metal limitation influences stream ecosystem function. NSF DEB Ecosystem Studies, Sole PI, **$717,956**, 2020-2025.

Connecting local stormwater decision-making to environmental outcomes. NSF CBET Environmental Sustainability, co-PI, **$299,999** ($236,633 to KSU), 2018-2021. (PI: Anne Jefferson).

Measuring cyanobacterial response to trace metal enrichment. US Geological Survey, PI, **$51,325**, 2017–2019.

Improving the quantitative skills of undergraduates in Biological Sciences. KSU University Teaching Council Summer Teaching Development Grant, **$9,000**, 2018.

Trace metal limitation of biofilm growth and metabolism: potential consequences for storage of nutrients in headwater streams. Ohio Water Resources Center, PI, **$24,340**, 2016–2017.

Nickel partitioning to oxic sediments: Using natural sediments to estimate Ni partitioning and removal rates. Nickel Producers Environmental Research Association (NiPERA). Principal Investigator, **$25,000**, 2015–2016.

Primary production in Huron Mountain streams: Trace metal use and spatial variability. Huron Mountain Wildlife Foundation. Principal Investigator, **$7,158**, 2015–2017. (Co-PI: AS Fitzgibbon).

Validating ecological indicators of metal bioavailability: A study of the Thompson and Birchtree mines, Thompson, Manitoba. NiPERA. Principal Investigator, **$146,000** ($71,165 to KSU). 2013–2015. (Co-PI: GA Burton)

Improved predictions of metal bioavailability in freshwater sediments. Non-Ferrous Metal Industry Research Organizations. Principal Investigator, **$497,000** ($100,000 to KSU), 2012–2015. (Co-PIs: GA Burton, CR Hammerschmidt)

Predicting the potential effects of metal contaminated sediments on diverse stream communities. Rio Tinto. Principal Investigator, **$10,000**, 2011. (co-PI: GA Burton)

Modeling the effects of invasive earthworms on watershed nitrogen dynamics. NSF Doctoral Dissertation Improvement Grant. Principal Investigator, **$9,839**, 2008. (co-PI: GA Lamberti)

TEACHING EXPERIENCE

Quantitative Methods in Biology (KSU, 2019–2020), Biological Statistics (KSU, 2014–2018), Stream Biology (KSU, 2015–2019), Writing in Biological Sciences (KSU, 2015–2019), Natural Resource Statistics (SNRE, 2011–2013)

STUDENT ADVISING

Major advisor for: Sean Nussle (MS, 2018), Erik Hartung (MS, 2017), Andrea Fitzgibbon (PhD, 2014–current), Raissa Mendonca (PhD, 2014–current), Jordyn Stoll (PhD, 2017–current), Taylor Michael (PhD, 2018–current), Andrew Blinn (MS, 2019–current)

Member of graduate committee: 18 total students, 8 complete and 10 current

Advisor for undergraduate independent research (e.g., REU, honors): 25 total students, 2 current

AWARDS AND HONORS

Exceptional Paper in *Environmental Toxicology and Chemistry* (2019) for "*Hitting reset on sediment toxicity: Sediment homogenization alters the toxicity of metal amended sediments"*

Exceptional Reviewer in *Environmental Toxicology and Chemistry* (2017, 2018)

Outstanding Graduate Student Teacher Award for Excellence in Teaching, Kaneb Center for Teaching and Learning, Notre Dame (2009)

Best Oral Presentation in Basic Research (runner-up) at the Annual Meeting of The North American Benthological Society, Columbia, SC (2007)

Member (elected), Sigma Xi (2004)

Member (elected), Phi Beta Kappa Honor Society (2004)

SELECT SCHOLARLY PRESENTATIONS (87 total) * indicates student-coauthor

Costello, DM, JT Stoll*, AS Fitzgibbon*, and JH Larson. Nutrient and trace metal co-limitation of algal blooms in the Great Lakes. *Annual Meeting of the Society for Freshwater Science*, Detroit, MI, 2018.

Nussle, SB*, and **DM Costello**. Trichopterans as biomonitors of trace and heavy metals in northeastern Ohio urban streams. *Annual Meeting of the Society for Freshwater Science*, Detroit, MI, 2018.

Michael, T*, AS Fitzgibbon*, **DM Costello**, and LE Kinsman-Costello. Invertebrate activities in wetland sediments influence oxygen and nutrient dynamics at the sediment–water interface. *Annual Meeting of the Society for Freshwater Science*, Detroit, MI, 2018.

Risteca, P*, AS Fitzgibbon*, **DM Costello**, SD Tiegs, and JJ Kelly. Relationships between watershed landuse and bacterial colonization and decomposition of terrestrial litter in streams. *Annual Meeting of the Society for Freshwater Science*, Detroit, MI, 2018.

Zahorec, A* and **DM Costello**. (poster) Evaluating the impacts of road salt runoff on pond snails. *North American Meeting of SETAC*, Minneapolis, MN, 2017.

Fitzgibbon AS* and **DM Costello**. Micron-scale spatial and diel variation in oxygen at the biofilm–sediment interface. *Annual Meeting of the Society for Freshwater Science*, Sacramento, CA, 2016. Award: Best Poster Presentation in Basic Research

Costello, DM, AM Harrison*, GA Burton, and CR Hammerschmidt. Variation in sediment redox potential influences metal biogeochemistry and toxicity. *Joint Aquatic Sciences Meeting*, Portland, OR, 2014.

Hammerschmidt, CR, **DM Costello**, and GA Burton. Copper is rapidly removed, undergoes dynamic chemical speciation, and not remobilized from sediment. *European Chemicals Agency*, Helsinki, Finland, 2014.

Vangheluwe, M, JM Besser, WG Brumbaugh, C Ingersoll, GA Burton, **DM Costello**, CR Hammerschmidt, EC Rogevich, CE Schlekat. Scientific basis for the derivation of site-specific environmental quality standards for nickel in sediments. *International Conference on Deriving Environmental Quality Standards for the Protection of Aquatic Ecosystems*, Hong Kong, 2011.

PROFESSIONAL AFFILIATIONS

Society for Freshwater Science, Society of Environmental Toxicology and Chemistry (SETAC), Ecological Society of America, Phi Beta Kappa, Sigma Xi

SERVICE AND SYNERGISTIC ACTIVITIES

Editor, Environmental Toxicology & Chemistry (2019–present)

Co-chair, Ad-hoc Committee on Membership and Data, Society for Freshwater Science (2018–present)

Invited participant, Modeling Ecotoxicological Dynamics Subject to Stoichiometric Constraints, National Institute for Mathematical and Biological Synthesis, University of Tennessee (2018)

Invited participant, Training in Bayesian Modeling for Practicing Ecologists, NSF-sponsored workshop, Colorado State University (2016)

Graduate Studies Committee Member, KSU Department of Biology (2015–2016)

Editorial Board Member, Environmental Toxicology & Chemistry (2014–2018)

Representative, Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) (2014–present)

Invited expert, European Chemicals Agency (ECHA) Topical Scientific Workshop: Risk Assessment for the Sediment Compartment, Helsinki, Finland (2013)

Board of Directors (elected), Early Career Delegate, Society for Freshwater Science (2012–2015)

Ad Hoc Reviewer for 21 journals and granting agencies including: *Applied Soil Ecology, Canadian Journal of Fisheries & Aquatic Sciences, Ecological Applications, Ecology, Environmental Science & Technology*, *Environmental Toxicology & Chemistry, Freshwater Science, Green Chemistry, Journal of Great Lakes Research*, *Science of the Total Environment, Sea Grant*