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Konrad Kulacki, Ph.D.

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Professional Profile

Dr. Kulacki specializes in aquatic ecology and ecotoxicology. He has 10 years of experience in studying the effects of anthropogenic stressors on aquatic organisms and ecosystems. He is familiar with the risks associated with numerous environmental pollutants, including biological, chemical, and physical stressors, and with the various methods available to evaluate their effects.

Dr. Kulacki has performed standard versions of many aquatic toxicological bioassays, and has also modified existing protocols to provide additional important ecological information. In addition to laboratory work, Dr. Kulacki has experience in field-based analysis of the environmental quality of lakes and streams.

Dr. Kulacki's doctoral research investigated the effects of room-temperature ionic liquids—an emerging class of industrial solvents—on freshwater primary producers and consumers. His post-doctoral work focused on the effects of engineered nanoparticles on benthic and pelagic primary producers and consumers, and on the relative effects of anthropogenic stressors, including eutrophication, biodiversity loss, and herbicides, on the structure and function of stream communities. He has worked effectively on multidisciplinary teams that included chemical engineers, mathematical modelers, microbial ecologists, and watershed planners.

Academic Credentials & Professional Honors

Ph.D., Biological Sciences, University of Notre Dame, 2009

B.S., Environmental Science and Management, Michigan State University, 2002

Licenses and Certifications

40-Hour Hazardous Waste Operation and Emergency Response Certification (HAZWOPER)

Prior Experience

Postdoctoral Researcher, University of Michigan, 2011-2013

Postdoctoral Researcher, University of California Santa Barbara, 2009-2011

Graduate Research and Teaching Assistant, University of Notre Dame, 2003-2009

Limnology Laboratory Technician, Michigan State University, 2002-2003

Professional Affiliations

Society of Freshwater Science—SFS

Society of Environmental Toxicology and Chemistry—SETAC

- National and Regional North Atlantic Chapter

Publications

Steele, A.N., K.J. Kulacki, M.L. Fleming, and W.L. Goodfellow, Jr. 2022. Whole effluent toxicity assessments and experimental considerations for evaluating coagulation agents and polymers for wastewater treatment of coal combustion. Proceedings of the World of Coal Ash Conference, May 16-19, 2022. 16pp.

Gard, N.W., M.R. Edwards, K.J. Kulacki, and T.C. Ginn. 2021. Limitations on Development of Polychlorinated Biphenyl Tissue Concentration Thresholds for Survival, Growth, and Reproduction in Fish. Environmental Toxicology and Chemistry 40 (8), 2085-2097

Driscoll, S.K., K.J. Kulacki, and S. Marzooghi. 2020. A Review of the Literature on Potential Effects of Runoff from Refined Coal-Tar-Based Sealant Coating on Aquatic Organisms. Integrated Environmental Assessment and Management 16: 17-27.

Costello DM, Kulacki KJ, McCarthy ME, Tiegs SD, Cardinale BJ (2018) Ranking stressor impacts on periphyton structure and function with mesocosm experiments and environmental- change forecasts. PLoS ONE 13(9): e0204510.

Ziccardi, L. A. Edgington, K. Hentz, K. Kulacki, and S.K. Driscoll. Microplastics as vectors for bioaccumulation of hydrophobic organic chemicals in the marine environment: A State-of-the-Science review. Environmental Toxicology and Chemistry 2016; 35:1667-1676.

Kulacki KJ, Cardinale BJ. Effects of nano-titanium dioxide on freshwater algal population dynamics. PLoS-ONE 2012; 7(10): e47130. doi:10.1371/journal.pone.0047130.

Kulacki KJ, Cardinale BJ, Bier RA, Dickson HM. How do stream organisms respond to, and influence, the concentration of TiO2 nanoparticles? A mesocosm study with algae and herbivores. Environmental Toxicology and Chemistry 2012; 31:2414-2422.

Kulacki KJ, Chaloner DT, Larson JH, Costello DM, Evans-White MA, Docherty KM, Bernot RJ, Brueseke MA, Kulpa CF, Lamberti GA. Proactive aquatic ecotoxicological assessment of room-temperature ionic liquids. Current Organic Chemistry 2011; 15:1918-1927.

Sena, D.W., Kulacki KJ, Chaloner DT, Lamberti GA. The role of the cell wall in the toxicity of ionic liquids to the alga Chlamydomonas reinhardtii. Green Chemistry 2010; 12:1066-1071.

Docherty KM, Joyce MV, Kulacki KJ, Kulpa CF. Microbial degradation and metabolite toxicity of three pyridinium-based cation ionic liquids. Green Chemistry 2010; 12:701-712.

Kulacki KJ, Lamberti GA. Toxicity of imidazolium ionic liquids to freshwater algae. Green Chemistry 2008;

10:104-110.

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

Selected Presentations

Kulacki K, Driscoll SK, Kierski M, Sanders J, Goodfellow W. Macroplastics in the environment. SETAC, Toronto, Ontario, CA, November 3-7, 2019.

Driscoll SK, Hauri J, Kulacki K, Morrison AM, McArdle M, Schierz A, Yozzo K, Edwards M. The influence of mixing energy on the concentration and composition of oil in laboratory toxicity tests. SETAC, Orlando, FL, November 6-10, 2016.

Kulacki K, Ziccardi L, Hentz K, Driscoll SK. Can hydrophobic organic chemicals sorbed to microplastics affect aquatic organisms? A review of laboratory studies. SETAC, Orlando, FL, November 6-10, 2016.

Kulacki K, He N, Parent PJ, McCarthy ME, Costello DM, Tiegs SD, Fritschie KJ, Cardinale BJ. Stressed out streams: Ranking the effects of stressors on stream periphyton. ESA, Portland, OR, August 6-10, 2012.

Kulacki K, Bennett S, Cardinale B. Effects of n-TiO2 on freshwater phytoplankton. SETAC Boston, MA, November 13-17, 2011.

Kulacki K. Proactive aquatic ecotoxicology: Evaluating tomorrow's stressors today. Chapman University, March 11, 2011.

Kulacki K, Bier R, Dickson H, Cardinale B, Keller A, Nisbet R, Holden P, Klanjscek T, Priester J, Clark K, Thio R. Effects of nano-TiO2 on the structure and function of stream ecosystems: An ongoing experiment in freshwater mesocosms. ICEIN, Los Angeles, CA, May 11-13, 2010.

Kulacki KJ, Costello DM, Lamberti GA. Predicting the toxicity of novel chemicals to benthic and pelagic organisms using experimentation and mathematical modeling. NABS, Salt Lake City, UT, May 26-29, 2008.

Lamberti GA, Kulacki KJ, Docherty KM, Costello DM, Bernot RJ, Matsuo AYO, Larson JH, Brueseke MA, Dixon JK, Brennecke JF, Maginn EJ, Stadtherr MA, Chaloner DT, Kulpa Jr. CF. Ecotoxicity and biodegradability of ionic liquids for aquatic organisms. EMD-Merck Workshop, Notre Dame, IN, July 17, 2007.

Kulacki KJ, Bernot RJ, Chaloner DT, Lamberti GA. Combining experiments and modeling to evaluate ionic liquid toxicity to freshwater planktonic communities. BATIL, Berlin, Germany, May 6-8, 2007.

Kulacki KJ, Drake JM, Lodge DM. Developing a framework for invasive species risk assessment: Chemical risk assessment as a possible model. SETAC, Montreal, Canada, November 5-9, 2006.

Kulacki KJ, Lodge DM, Lamberti GA. Effects of novel ‘green' chemicals on freshwater plankton. SETAC - OVC, Fort Wayne, IN, April 21, 2006.

Project Experience

Designed and oversaw project that developed rankings for the effects of seven different chemical, biological, and physical stressors on stream structure and function, using 100+ laboratory mesocosms.

Investigated the mechanisms underlying the toxic effects of titanium dioxide nanoparticles (n TiO2) to freshwater phytoplankton. Examined algal physiology, competition with bacteria, and interactions with UV light and the effects of n-TiO2 on algal chlorophyll content.

Studied fate and effects of titanium dioxide nanoparticles in artificial stream mesocosms, and the relationships between concentrations of n-TiO2 in algal biofilms, algal biomass, and species diversity.

In collaboration with other scientists, reviewed the effects of room-temperature ionic liquids on aquatic organisms and published an invited paper on the topic.

Used standard acute toxicity tests to determine the toxicity of several room-temperature ionic liquids to freshwater algae, and examined the role of cell wall structure in determining toxicity.

Provided technical support to natural resource damage assessment (NRDA) of the Deepwater Horizon oil spill.

Provided analysis of fisheries catch data to identify causal linkages between upstream water usage changes and downstream effects for a litigation matter before SCOTUS.

Supported a net environmental benefits analysis (NEBA) for the closure of coal-fired power plants by evaluating human health risk assessments for coal ash basins at six sites.

For a pharmaceutical company, reviewed the life history of dung fauna invertebrate communities in support of registration of cattle antiparasitic treatments.

Provided statistical support in generating point estimates of lethal and sublethal effects for laboratory toxicity tests.

Performed research on historical baseline conditions at several coastal areas to which to compare current alleged injuries in support of litigation.

Managed reporting for a pilot study testing the efficacy of activated carbon sediment amendments in field and laboratory trials at reducing bioavailability of mercury and PCBs. Reviewed historic site operation materials for potentially responsible parties (PRPs) to assist in development of an allocation model for costs associated with remediation of contaminated river sediments.

Reviewed historic site operations, waste handling, and environmental data for clients in light of retrospective state-of-industry-knowledge to recover insurance-covered remediation costs.

Performed a literature review on the ability of microplastics in the environment to serve as vectors for hydrophobic organic contaminants. Review was submitted and accepted for publication.

Performed a screening level ecological risk assessment (SLERA) for an industrial facility discharging formaldehyde in anticipation of government changes to wastewater effluent restrictions.

Evaluated trends in water quality over time at multiple cities across the USA to support a causal analysis of air emissions on the environment.

Performed a site assessment of an aquaculture facility in support of an environmental assessment for AquAdvantage® salmon for AquaBounty Technologies, Inc.

Performed a literature review on the effects of refined coal-tar pavement sealants on aquatic environments.

Collected sediment cores in a tidal wetland as part of a study to determine long-term efficacy of activated carbon sediment amendments.

Estimated ecological risk to wildlife that use wetlands near a former hospital that had soils with elevated metals.

Evaluated an expert report on aquatic bioassay results in support of litigation. Contributed to preparation of a rebuttal report, in which we showed that the opposing expert's report was critically flawed in numerous ways.

Contributing author on revision of Organisation for Economic Co-operation and Development (OECD) Guidance Document on Aqueous-Phase Aquatic Toxicity Testing of Difficult Test Chemicals.

Prepared white paper on macroplastics in the environment, which covered sources, characterization, fate and transport, human and ecological effects, and identified key knowledge gaps.

Project manager and senior ecotoxicologist for a large, multi-facility evaluation of effluent toxicity including chemistry, process wastewater evaluation and toxicology assessment.

Peer Reviews

American Midland Naturalist

Chemical Research in Toxicology

Chemosphere

Ecological Applications

Ecology Letters

Ecotoxicology and Environmental Safety

Environmental Science and Pollution Research

Environmental Toxicology and Chemistry

Green Chemistry