

JUSTIN N. MURDOCK

Department of Biology
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PROFESSIONAL EXPERIENCE:

Professor Tennessee Technological University, Cookeville, TN	August 2022 - present
Interim Director of the Center for the Management, Utilization, and Protection of Water Resources Tennessee Technological University, Cookeville, TN	Sept 2022 – October 2023 May 2018 - October 2019
Associate Professor Tennessee Technological University, Cookeville, TN	August 2017 - July 2022
Assistant Professor Tennessee Technological University, Cookeville, TN	August 2012 - July 2017
Postdoctoral Research Associate USDA-Agricultural Research Service, National Sedimentation Laboratory, Oxford, MS	March 2009 - July 2012

EDUCATION:

- Kansas State University, PhD Biology**, Manhattan, KS; 2008
Dissertation: *Regulators of Stream Ecosystem Recovery from Disturbance*
Advisor: Walter Dodds
- Texas A&M University, MS Wildlife and Fisheries Science**, College Station, TX; 2002
Thesis: *Early Periphyton Accumulation and Composition in a Wastewater Effluent Dominated Stream: Effects of Season, Distance from Discharge, and Flow Regime*
Advisor: Daniel Roelke
- University of Kansas, BS Environmental Studies**, Lawrence, KS 1998

RESEARCH INTERESTS:

- Aquatic community ecology
- Biogeochemical cycles in aquatic systems
- Algal ecology and physiology
- Wetland ecology
- Invasive species

COURSES TAUGHT:

Tennessee Tech University:

Undergraduate: Limnology, Phycology, General Biology

Graduate: Stream Ecology, Advanced Microscopy, Aquatic Biogeochemistry

MENTORING:

Graduate Student Primary Advisor at Tennessee Tech University:

Kate Henderson (MS) – Graduated 2015

Lucas Hix (MS) – Graduated 2015

Natalie Knorp (PhD) – Graduated 2017

Andrea Engle (MS) – Graduated 2017

Jason Payne (MS) – Graduated 2018

Jordan Evans (MS) – Graduated 2018

Spencer Womble (MS) – Graduated 2019

Sam Day (MS) – Graduated 2019

Aden Blackburn (MS) – Graduated 2020

Morgan Michael (MS) – Graduated 2021

Spencer Womble (PhD) - Graduated 2023

Robert Brown (PhD) – Graduated 2023

Peter Blum (PhD) - current

Shrijana Duwadi (PhD) - current

Trevor Crawford (MS) – current

Dalton Tryba (MS) – current

Zoe Porter (PhD) - current

Graduate Student Supervisory Committee:

Alexandra Ashmead (MS) University of Mississippi - Graduated 2011

Michael Keating (MS) University of Mississippi – Graduated 2014

Justin Spaulding (MS) Tennessee Tech University – Graduated 2014

Traci Hudson (PhD) Arkansas State University – Graduated 2016

Juju Wellemeier (MS) Tennessee Tech University – Graduated 2016

Isabel Papraniku (MS) Tennessee Tech University – Graduated 2017

Kayla Key (PhD) Tennessee Tech University – Graduated 2019

Grace McClelland (PhD) Tennessee Tech University – Graduated 2019

William Wood (MS) Tennessee Tech University – Graduated 2019

Mackenzie White (MS) Tennessee Tech University – Graduated 2021

Vinay Dhanvada (MS) Tennessee Tech University – Graduated 2021

Nusrat Jannah Snigdha (MS) Tennessee Tech University – Graduated 2021

Ashley Padget (MS) Tennessee Tech University – Graduated 2022

Abbey Holsopple (MS) Tennessee Tech University – Graduated 2021

Makenzie Martin (MS) Tennessee Tech University – Graduated 2021

Brittney Bajo (MS) Tennessee Tech University – Graduated 2021

Ryan Hudson (MS) Tennessee Tech University – Graduated 2022
Samantha Allen (PhD) Tennessee Tech University – Graduated 2022
Collins Owassu (PhD) Tennessee Tech University – Graduated 2023
Tyler Befus (MS) Murray State University – current
Kendall Hamm (MS) Tennessee Tech University – Graduated 2023
Jack Fetters (MS) Tennessee Tech University – Graduated 2023
Andrew Gable (MS) Tennessee Tech University – current

Undergraduate Students Mentored:

Kansas State University

Alyssa Riley, Tyler Kholer; 2007, Jennifer Nemec; 2008

University of Mississippi

Daniel Warren, Ruvini Omattage; 2011-2012

Tennessee Tech University

Clayton Morgan 2014, Andrew Eager 2014-2015, Scott Hamby 2015, Kelly Dunham 2015-2016
Ashlee Nichols 2017-2019, Daniel Prieu 2017, Daniel Holt 2017, Kendall Powell 2018, Jesse
Flowers 2018, Melody Culver 2019, Trevor Crawford – 2018-2019, Savannah Gambrell - 2019
Rosi Laycock 2018-2019, Will Schibig 2019, Maria Mattingly 2019, Ryan Bauer 2019, Alexa
Janesh 2020-2021, Andrew Johnson 2020, Kirk Windrow 2020, Kathryn Wilkins 2021, Billy
Crumpton 2021, Isaac Nickles 2021, Gabi Burke 2021, Sydney Beltran 2021, Ashley Daniels 2021,
Andrew Rosson 2020-2022, Kelly Day 2020-2022, Amanda Laboy 2022, Gabi De Almeida 2022-
23, Drew Bucher 2022, Shawn Childress 2022, Elliot Payne 2022, Liz McCurry 2022-23 Victoria
Weldon 2023.

Full-Time Research Technicians:

Jordan Evans 2018-2020, Trevor Crawford 2019-2021, Mohera Narimetla 2021-2022, Rachel Reed
2022, Tatyanna Mann 2022, Stephanie Driscoll 2020-2022

GRANTS:

Total \$3,591,359

At TTU \$3,458,944 (\$3,218,913 as PI, \$240,031 as coPI)

\$47,835 internal TTU funding

- Tennessee Valley Authority. Detecting locations and potential causes of low oxygen zones in the Calfkiller River, Tennessee. 2023. PI Justin Murdock. \$144,121
- US Department of Agriculture Conservation Easement Assessment Program. Identifying tradeoffs in ecosystem services in restored agricultural wetlands in the Agricultural Conservation Easements Program-Wetland Reserve Easements (ACEP-WRE) program. 2023. PI Justin Murdock. \$272,692.
- US Army Corps of Engineers. Potential Bioaccumulated Contaminants in T&E Bat Food Sources. 2023. PI Justin Murdock. \$226,797.
- Tennessee Water Resources Research Center. Quantifying Microplastics from Tennessee's Wastewater Treatment Plants. 2022. PI Tania Datta, Co-PI Justin Murdock. \$26,175.

- US Army Corps of Engineers Engineering Research and Development Center. Determining Environmental Triggers of Harmful Algal Blooms and Toxin Production for the Purposes of HAB Prediction, Detection, and Management (HAB PDM). TTU PI Justin Murdock. \$425,000.
- TTU Faculty Committee Research Grant. Tracking how stream polychlorinated biphenyl (PCB) pollution moves across the aquatic/terrestrial boundary to accumulate in terrestrial consumers.. 2022. PI: Justin Murdock, co-PIs Tania Datta, Josh Hall. \$20,000.
- US Army Corps of Engineers Engineering Research and Development Center Workshop Grant. Workshop with Marshal University, Mississippi State University, and Tennessee Tech University. Identifying Management Needs to Predict, Detect and Manage Harmful Algal Blooms in Flowing Waters Results of Riverine HABs Workshop November 16-17, 2021 Huntington, West Virginia. TTU PI Justin Murdock. \$10,000.
- TTU Faculty Committee Research Grant. Quantifying Microplastics from Tennessee's Wastewater Treatment Plants into Receiving Streams. 2021. coPIs: Tania Datta and Justin Murdock. \$10,000.
- Tennessee Water Resources Research Center. Assessing Water Quality of Rivers Feeding Riparian Wetlands in Agroecosystems: Research Supporting the Evaluation of the USDA Wetlands Reserve Program. 2020. PI Justin Murdock, Co-PI Robert Brown. \$4,995.
- The Nature Conservancy and US Department of Agriculture. Assessment of WRP easements in the Lower Mississippi River Basin. 2018. PI Justin Murdock, Co-PI Alfred Kalyanapu. \$1,957,728.
- US Air Force. Evaluation of Aquatic Resources to Support Bat Foraging Habitat at Arnold Engineering Development Center, Arnold Air Force Base, with an Emphasis on Rare, Threatened and Endangered Aquatic Species. 2018. PI Hayden Mattingly, coPIs Justin Murdock, Kit Wheeler, Keith Gibbs. \$129,690
- Duke Energy. Assessing the distribution of Didymo in North Carolina streams. 2017. PI: Justin Murdock. \$31,508.
- US Department of Agriculture Agricultural Research Service. Nutrient Cycling in Aquatic Agroecosystems. 2017 PI: Justin Murdock. \$50,000.
- US National Park Service. Assessment of Benthic Macroinvertebrate Response to Antimycin During Brook Trout Restoration. 2017. co-PIs Keith Gibbs and Justin Murdock. \$5,000.
- US Fish and Wildlife Service. Effects of Asian Carp Invasion on the Food Web of a Mussel Biodiversity Hotspot in Tennessee. 2016. PI Mark Rogers, Co-PIs Justin Murdock, Phil Betolli, and Don Hubbs. \$24,610.
- US Fish and Wildlife Service. Monitoring for *Didymosphenia geminata*: An Environmental DNA Approach. 2015. co-PIs Justin Murdock and Greg Moyer. \$24,978.
- TTU Faculty Committee Research Grant. Development of a rapid spectroscopic screening process for assessing algal response to environmental change. 2015. coPIs: Justin Murdock and Andrew Calendar. \$10,000.
- TTU Faculty Development Fund. 2015. PI: Justin Murdock. \$1,435.
- US Fish and Wildlife Service. Effects of *Didymosphenia geminata* invasion on riverine food webs in the upper Tennessee River basin. 2014. Co-PIs Justin Murdock and Natalie Knorp. \$19,578.
- Tennessee Wildlife Resources Agency. Determining stream susceptibility to colonization and proliferation of the alga *Didymosphenia geminata* (Didymo) in the Chilhowee Reservoir watershed. Tallassee Fund: 2013. PI: Justin Murdock; Co-PI Matt Kulp. \$17,500.
- Trout Unlimited. Determining *Didymosphenia geminata* (Didymo) distribution and colonization potential in Tennessee streams. 2013. PI: Justin Murdock; Co-PIs Matt Kulp, Stephen Moore. \$10,000.
- US Department of Agriculture Agricultural Research Service. Microbial Roles in Water Improvement. 2012. PI: Justin Murdock. \$49,737.
- TTU Faculty Committee Research Grant. Development of dual carbon and nitrogen isotope detection with FT-IR microspectroscopy. 2013 PI: Justin Murdock. \$5,000.

- TTU Faculty Development Fund. 2013 PI: Justin Murdock. \$1,400.
- National Science Foundation. MRI: Acquisition of an Imaging Flow Cytometer for Multidisciplinary Organic and Inorganic Particle Research and Education. 2010. PI: Clifford Ochs. \$102,415.
- Brookhaven National Laboratory. Beam time at the National Synchrotron Light Source. 18 days (valued at \$1500 per day). 2008. Co-PIs Justin Murdock and David Wetzell. \$27,000.
- City of College Station, Texas. Municipal wastewater effects on stream water quality. 2000. PI: Justin Murdock. \$3,000.

AWARDS:

- Tennessee Tech University Wings Up 100 Research Achievement Award. 2019, 2020, 2021, 2022, 2023.
- Outstanding Reviewer: Freshwater Science. 2018
- Kansas State University, Division of Biology. John C. Frazier Award for Excellence in Graduate Student Research. 2007.
- Runner up, best oral presentation for basic science. North American Benthological Society. Anchorage, Alaska. 2006.

PROFESSIONAL MEMBERSHIPS:

- Society of Wetland Scientists
- American Geophysical Union
- Society for Freshwater Science
- International Phycological Society

SERVICE AND OUTREACH:

Professional Service

- State of Tennessee Harmful Algal Bloom working group member
- State of Tennessee Stream Nutrient Reduction Taskforce member
- Journal reviewer for *Algae, Algal Research, Aquatic Ecology, Aquatic Sciences, Analytical Letters, Applied Spectroscopy, Biologia, Biogeosciences, Constana, European Journal of Phycology, Ecological Engineering, Ecological Modeling, Ecotoxicology, Ecotoxicology and Environmental Safety, Environmental Management, Environmental Science & Technology, Fisheries Management, Freshwater Biology, Freshwater Science, Frontiers in Plant Science, Fundamental and Applied Limnology, Hydrobiologia, Journal of Applied Phycology, Journal of Freshwater Ecology, Journal of Hazardous Materials, Journal of the North American Benthological Society, Limnetica, Limnology and Oceanography: Methods, Marine and Freshwater Research, Polish Journal of Environmental Studies*
- National Science Foundation ad-hoc reviewer
- EPA STAR Graduate Fellowship Program reviewer
- Textbook proposal review (Phycology 5th Edition, Robert Lee) for Cambridge University Press
- TTU representative to the US Army Corps of Engineers' Cordell Hull Reservoir 2019 Master Plan Revision

- Student presentation and poster judge at annual meetings of the Society for Freshwater Science. 2009-2018.

Community Service

- Tennessee Science Olympiad Judge 2020
- Putnam County Tornado Runoff Water Quality Monitoring 2020
- Career Day speaker, Northeast Elementary School and Avery Trace Middle School, Cookeville, TN. 2012-2019
- High School STEM Science Fair Judge 2019
- Speaker at Trout Unlimited; Little River Chapter, and Tennessee State Chapter meetings. 2015-2016
- Ecology seminar speaker for Boy Scouts of America Venturing program, Latimer High Adventure Reservation. 2015
- Participant in the USDA National Sedimentation Adopt-a-school program. 2009-2011.
- Speaker in Ripley Middle School “Career Class”. Speak to ~200 middle school students each year in a rural Mississippi school system about possible careers in aquatic sciences. 2009-2010.
- Judge at Annual Science Fair. Della Davidson Elementary School. 5th and 6th grade students. 2009.

University Service

- Interim Director of the TTU Center for the Management Utilization and Protection of Water Resources 2018-2019, 2022-2023
- Research Leader for the Center for the Management, Utilization, and Protection of Water Resources’ Biodiversity area. 2017-2022
- Adjunct Faculty in the School of Environmental and Sustainability Studies 2012-2022
- Advisory faculty for the School of Environmental and Sustainability Studies undergraduate and professional masters programs. 2014-2022.
- School of Environmental and Sustainability Studies Curriculum Committee 2018-2021
- College of Arts and Sciences representative on the University Research Advisory Committee. 2017-2018.
- Search Committee Member for Department of Agriculture faculty member 2020
- Chair: Environmental Studies Program Graduate Student Application Review Committee. 2016-2017
- Chair: Environmental Studies Program Curriculum Review Committee. 2016-2017
- Southern Appalachian Cooperative Ecosystem Studies Unit (CESU) university liaison. 2016-2022
- Coordinated the National Park Service Cooperative Ecosystem Studies Unit (CESU) Master Agreement resubmittal. 2018.
- Water Center Director Search Committee member 2019
- TTU Research Day poster judge 2012-2021

PEER REVIEWED PUBLICATIONS:

Lizotte Jr, R. E., **Murdock, J. N.**, Taylor, J. M., & Locke, M. A. 2023. Nutrient and algal responses to a managed drawdown in an agricultural riverine lake. *Chemistry and Ecology*, 39(4), 319-336.

White, M., Wheeler, K., Hudson, R. R., and **Murdock, J. N.** 2022. Salmon of the Southeastern US: Sucker migrations deliver resource subsidies to oligotrophic stream. *Ecology of Freshwater Fish*.

32(1):181-194.

Henderson, K.A, **Murdock, J.N.**, and Lizotte, R.E., Jr. 2021. Water depth influences algal distribution and productivity in shallow agricultural lakes. *Ecohydrology*. 14(6), doi.org/10.1002/eco.2319.

Evans, J.L., **Murdock, J.N.**, Taylor, J.M., and Lizotte, R.E., Jr. 2021. Sediment nutrient flux rates in a shallow, turbid lake are more dependent on water quality than lake depth. *Water*. 13(10): 1344.

Peace, A., P.C. Frost, N.D. Wagner, M. Danger, C. Accolla, P. Antczak, B.W. Brooks, D.M. Costello, R.A. Everett, K.B. Flores, C.M. Heggerud, R. Karimi, Y. Kang, Y. Kuang, J.H. Larson, T. Mathews, G.D. Mayer, **J.N. Murdock**, C.A. Murphy, R.M. Nisbet, L. Pecquerie, N. Pollesch, E.M. Rutter, K.L. Schulz, J.T. Scott, L. Stevenson, H. Wang. 2021. Stoichiometric ecotoxicology for a multi-substance world. *Bioscience*. 71(2), 132-147.

Hix, L.A., and **J.N. Murdock**. 2019. *Didymosphenia geminata* establishment and mat accumulation require distinct water quality conditions in the upper Tennessee River basin. *Freshwater Biology Hydrobiologia*. 828 (1), 147-164.

Kunza, L.A., C.A. Gillis, J.Z. Haueter, **J.N. Murdock**, J.M. O'Brien. 2018. Oligotrophication as a potential driver for the emergence of *Didymosphenia geminata* in North American rivers. *River Research and Applications*. 34 (8), 1105-1110.

Knorp, K.E. and **J.N. Murdock**. 2017. Cage design has minimal impacts on benthic macroinvertebrate and algae colonization in submersible exclusions. *Aquatic Ecology*. 51 (4), 545-556.

Murdock, J.N. 2016. Detecting carbon uptake and cellular allocation by individual algae in multi-species assemblages. *Limnology and Oceanography: Methods*. 14 (2), 124-137.

Bertrand, K N., M.R. Whiles, K.B. Gido, and **J.N. Murdock**. 2013. Influence of macroconsumers and stream position on invertebrate assemblage development following flooding in intermittent prairie streams. *Hydrobiologia*. 714 (1) 169-182.

Murdock, J.N., F.D. Shields Jr., and R.E. Lizotte Jr. 2013. Periphyton responses to nutrients and atrazine introduced through agricultural runoff in a riverine wetland. *Ecotoxicology* 22: 215-230.

Murdock, J.N. and D.L. Wetzel. 2012. Measuring the response of individual algal cells to nutrient and herbicide mixtures within natural biofilms. *Microbial Ecology*. 63:761-772.

Lizotte Jr., R.E., F.D. Shields Jr., **J.N. Murdock**, R. Kröger, and S.S. Knight. 2012. Mitigating agrichemicals from an artificial runoff event using a managed riverine wetland. *Science of the Total Environment*. 427-428.

Lizotte Jr., R.E., F.D. Shields Jr., **J.N. Murdock**, and S.S. Knight. 2012. Responses of *Hyaella azteca* and phytoplankton to a simulated agricultural runoff event in a managed backwater wetland. *Chemosphere*. 87:684-691.

Kholer, T.J., **J.N. Murdock**, K.B. Gido, and W.K. Dodds. 2011. Nutrient loading and grazing by the minnow *Phoxinus erythrogaster* shift periphyton abundance and stoichiometry in experimental streams. *Freshwater Biology*. 56:1133-1146.

Murdock, J.N., W.K. Dodds, K.B. Gido, and M.R. Whiles. 2011. Dynamic influences of nutrients and grazing fish on benthic algae during recovery from flood. *Journal of the North American Benthological Society*. 30:331-345.

Murdock, J.N., W.K. Dodds, J.A. Reffner, and D.L. Wetzel. 2010. Measuring cellular scale nutrient distribution in algal biofilms with synchrotron confocal infrared microspectroscopy. *Spectroscopy*. 25:32-41.

Murdock, J.N., K.B. Gido, W.K. Dodds, K.N. Bertrand, and M.R. Whiles. 2010. Consumer return chronology alters recovery trajectory of stream ecosystem structure and function following drought. *Ecology* 91:1048–1062.

Murdock, J.N. and D.L. Wetzel. 2009. FT-IR Microspectroscopy enhances biological and ecological analysis of algae. *Applied Spectroscopy Reviews* 44:335-361.

Bertrand, K.N., K.B. Gido, W.K. Dodds, **J.N. Murdock** and M.R. Whiles. 2009. Disturbance frequency and functional identity mediate ecosystem processes in prairie streams. *Oikos* 118: 917-933.

Murdock, J.N., W.K. Dodds and D.L. Wetzel. 2008. Subcellular chemical imaging of localized benthic algal nutritional content via HgCdTe array FT-IR. *Vibrational Spectroscopy* 48:179-188.

Dodds, W.K., J.J. Beaulieu, J.J. Eichmiller, J.R. Fischer, N.R. Franssen, D.A. Gudder, A.S. Makinster, M.J. McCarthy, **J.N. Murdock**, J.M. O'Brien, J.L. Tank and R.W. Sheibley. 2008. Nitrogen cycling and metabolism in the thalweg of a prairie river. *Journal of Geophysical Research Biogeosciences*. 113, G04029, doi:10.1029/2008JG000696.

Murdock, J.N. and W.K. Dodds. 2007. Linking benthic algal biomass to stream substratum topography. *Journal of Phycology* 43:449-460.

O'Brien, J., W.K. Dodds, K.C. Wilson, **J.N. Murdock**, and J.J. Eichmiller. 2007. The transport, cycling, and retention of NO₃⁻ in streams: ¹⁵N experiments across a gradient of NO₃⁻ concentrations. *Biogeochemistry* 84:31-49.

Murdock, J.N., D.R. Roelke, and F.P. Gelwick. 2004. Interactions between flow, periphyton, and nutrients in a heavily impacted urban stream: implications for stream restoration effectiveness. *Ecological Engineering* 22:197-207.

OTHER PUBLICATIONS:

Gido, K.B., K.N. Bertrand, **J.N. Murdock**, W.K. Dodds, and M.R. Whiles. 2010. Disturbance mediated effects of fishes on stream ecosystem processes: concepts and results from highly variable prairie streams. In *Community Ecology of Stream Fishes: Concepts, Approaches and Techniques*. K. Gido and D. Jackson (Eds.). 664p. American Fisheries Society.

Murdock, J.N. 2008. Ecological engineering: Ecological management of streams. In S.E. Jorgensen and B. Fath [Eds.] *Encyclopedia of Ecology*. 4:3382-3390. Elsevier.

Murdock, J.N. 2008. Ecological engineering: Ecological restoration of streams. In S.E. Jorgensen and B. Fath [Eds.] *Encyclopedia of Ecology*. 4:3390-3397. Elsevier.

Murdock J.N. and W.K. Dodds. 2007. Eutrophication effects on large rivers. National Scientific Technical Exchange Partnership and Support (N-STEPS).

REPORTS:

M. Yeager-Armstead, B. Baker, A. Linhoss, **J.N. Murdock**, and P. Parajuli. 2022.. USACE ERDC Technical Report: Identifying Management Needs to Predict, Detect and Manage Harmful Algal Blooms in Flowing Waters Results of Riverine HABs Workshop November 16-17, 2021 Huntington, West Virginia.

H. Mattingly, **J.N. Murdock**, C. Wheeler, and K. Gibbs. AEDC Bat-Related Aquatic Resources Study – Evaluation of Aquatic Resources to Support Bat Foraging Habitat at Arnold Engineering Development Center, Arnold Air Force Base, with an Emphasis on Rare, Threatened, and Endangered Aquatic Species. Final Report. December 31, 2021.

J.N. Murdock. 2019 Determining the current distribution and potential spread of *Didymo* in North Carolina streams. Duke Energy.

Rogers, M, and **J.N. Murdock**. 2019. Effects of Asian Carp Invasion on the Food Web of a Mussel Biodiversity Hotspot in Tennessee. Fish and Aquatic Conservation Program AIS and FIS Program, US Fish & Wildlife Service.

W.K. Gibbs, **J.N. Murdock**, and M.A. Kulp. **2019**. Assessment of Benthic Macroinvertebrate Response to Antimycin during Brook Trout Restoration in Little Cataloochee Creek, Great Smoky Mountains National Park - Study #: GRMS-02362, Permit #: GRSM-2015-SCI-2362

Murdock, J.N., K.A. Henderson, and J.H. Payne. Microbial Roles in Water Quality Improvement. USDA Agricultural Research Service; National Sedimentation Laboratory. 121pp. November 2017.

Murdock, J.N. and N.E. Knorp. 2016. Effects of *Didymosphenia geminata* on riverine food webs in the upper Tennessee River basin. Final Report to the Gulf Coast Marine Fisheries Commission. 55 pp.

Murdock, J.N., L.A. Hix, and A.N. Engle. 2016. Determining stream susceptibility to colonization and proliferation of the alga *Didymosphenia geminata* in the Chilhowee Reservoir watershed. Natural Resource Report NPS/GSMP/NRR—2016. National Park Service, Fort Collins, Colorado.

Murdock, J.N. and N.E. Knorp. 2016. Monitoring for *Didymosphenia geminata*: An Environmental DNA Approach. Final Report to the Gulf Coast Marine Fisheries Commission. 50 pp.

INVITED PRESENTATIONS:

2023 Methods for assessing nutrient retention in restored wetlands. H2Ohio Wetland Restoration Conference. Columbus, Ohio.

Tennessee Tech Student Chapter ACS Seminar.

2022 Agricultural floodplain wetlands can have multiple functional recovery trajectories depending on restoration design. American Geophysical Union's National Conference, Chicago, IL.

Designing the future of Mississippi River riparian wetlands: How restoration planning can reduce downstream nutrients. Kent State University.

Nutrient retention recovery in restored floodplain wetlands. Southern Illinois University

Panel: Designing and Implementing Effective Long-Term Wetland Monitoring. Joint Aquatic Sciences Meeting, Grand Rapids, MI.

USDA NRCS Tennessee/Kentucky State Technical Meeting. Nutrient Retention and Soil Health. Virtual.

2021 *Didymosphenia geminata* in Tennessee and North Carolina. Great Lakes Panel on Aquatic Nuisance Species. Virtual.

2020 Didymo in the Tuckasegee River. Trout Unlimited Tuckasegee Chapter. Silva, NC.

2019 Assessing nutrient retention within Wetlands Reserve Program easements in Kentucky and Tennessee. Four Rivers Watershed Sustainability Summit. Murray State University.

Distribution of *Didymosphenia geminata* in the Southern Appalachian Mountains. American Fisheries Society Invasive Species Panel, East Coast Trout Management and Culture Workshop. Frostburg, Maryland.

Wetland Reserve program research in Tennessee. USDA NRCS Tennessee State Technical Committee. Murfreesboro, TN.

Improving Nutrient Retention in Agricultural Watersheds Through Floodplain Wetland Restoration. Southeastern Water Pollution Biologists Association annual meeting. Chattanooga, TN.

2017 The impact of *Didymosphenia geminata* mats varies across trophic levels in Southern Appalachian streams. Austin Peay State University.

The impact of *Didymosphenia geminata* mats varies across trophic levels in Southern Appalachian streams. Southern Appalachian Cooperative Ecosystem Studies Unit annual meeting.

2016 Highlighting the importance of algal biodiversity through cellular level nutrient measurements. Middle Tennessee State University.

Trout Unlimited. Tennessee Coldwater Meeting. Current distribution and potential spread of *Didymo* in Tennessee.

2015 Trout Unlimited. Little River Chapter, TN. Distribution and impact of *Didymo* in Southern Appalachian streams.

2010 Macro- and micro-scale regulators of stream recovery from disturbance. Invited presentation. University of Mississippi.

PRESENTATIONS:

2022 Nutrient Retention Recovery Across Space and Time in Restored Agricultural Wetlands. Joint Aquatic Sciences Meeting, Grand Rapids, MI.

2021 Marine and Freshwater HAB Monitoring Using the FlowCam. National Monitoring Conference. Virtual.

Nutrient recovery trajectories of restored riparian wetlands in agricultural watersheds
Society of Freshwater Science national meeting. Virtual.

2020 Evolution of FlowCam for Cyanobacteria HAB Research and Monitoring. North American Lake Management Society Conference – Virtual.

Nutrient recovery trajectories of restored riparian wetlands in agricultural watersheds
Society of Freshwater Science national meeting. Virtual.

2019 Assessing the Restoration Success of the Wetlands Reserve Program in Western Kentucky and Tennessee. West Tennessee Water Resources Symposium, Jackson, TN.

Detecting water quality thresholds for algal blooms using a short-term, multi-species assay.
Society for Freshwater Science national conference. Salt Lake City, UT.

2018 Surface water quantity management can improve water quality and nutrient retention in agricultural watersheds. West Tennessee Water Resources Symposium. Jackson, TN.

Surface water quantity can regulate aquatic agroecosystem water quality and nutrient retention.
Tennessee American Water Resources Association Meeting. Montgomery Bell State Park, TN.

Surface water availability can regulate water quality and nutrient retention in aquatic agroecosystems. Society for Freshwater Science national meeting. Detroit. MI.

2017 Flow and large consumer alterations can have limited impacts on benthic colonization in productive agricultural streams. Society for Freshwater Science national meeting. Raleigh, NC.

Dissolved oxygen dynamics in turbid, high-nutrient agricultural lakes. West Tennessee Water Resources Symposium, Jackson, TN.

2016 The effects *Didymosphenia geminata* varies across trophic levels in Southern Appalachian mountain streams. Society of Freshwater Science annual meeting. Sacramento, CA.

2015 Macroinvertebrate structural and consumption responses to *Didymosphenia geminata* mats in the upper Tennessee River watershed. Society of Freshwater Science annual meeting. Milwaukee, WI.

- 2014 Tennessee Academy of Sciences annual meeting. Nutrients, suspended sediment, and hydrology interact to regulate dissolved oxygen in agricultural lakes and streams.
- Algal regulation of dissolved oxygen dynamics in turbid, high nutrient agricultural lakes. Society of Freshwater Science annual meeting. Portland, OR.
- 2013 Relative importance of light and nutrients on algal productivity in turbid, high nutrient lakes. Society of Freshwater Science annual meeting. Jacksonville, FL.
- 2012 Measuring carbon uptake in individual algae within multi-species assemblages. Society of Freshwater Science annual meeting. Louisville, KY.
- 2011 International Conference on Advanced Vibrational Spectroscopy. Tracking carbon isotope incorporation into algal cells with synchrotron infrared microspectroscopy.
- North American Benthological Society Annual Conference. Spatial variation in microbial nutrient limitation in low gradient agricultural streams. Providence, RI.
- 2010 North American Benthological Society Annual Conference. Detecting species-specific algal responses to a nutrient and herbicide mixture in benthic assemblages with infrared microspectroscopy. Santa Fe, NM.
- 2009 Federation of Analytical Chemistry and Spectroscopy Societies. Analysis of algal physiological response to pollutants with synchrotron infrared microspectroscopy.
- 2008 North American Benthological Society Annual Conference. Detecting single cell algal nutritional content and nitrogen uptake in natural benthic assemblages. Salt Lake City, UT.
- Student Research Forum, Kansas State University. Detecting single cell algal nutritional content and nitrogen uptake in natural benthic assemblages.
- 2007 International Conference on Advanced Vibrational Spectroscopy. Subcellular chemical imaging of localized growth response to nutrients via FT-IR focal plane array. Poster.
- North American Benthological Society Annual Conference. Recovery of intermittent prairie streams from drought. Columbia, SC.
- Federation of Analytical Chemistry and Spectroscopy Societies Spatially resolved FT-IR microspectroscopy of the nutritional status of stream algae.
- Graduate Student Research Forum, Kansas State University. Recovery of prairie stream algae following drought.
- 2006 North American Benthological Society Annual Conference. Linking benthic algal biomass to substrata roughness and orientation: a quantitative approach. Anchorage, AK.
- Konza LTER Workshop. Linking substrata roughness and orientation to benthic algal development.

Ecology and Evolutionary Biology Seminar, Kansas State University. Fishes and floods: Recovery of prairie stream ecosystems following floods.

2005 North American Benthological Society Annual Conference. Physical factors influencing periphyton accumulation in a prairie stream. Poster. New Orleans, LA.

Graduate Student Research Forum, Kansas State University. Effects of substratum orientation and surface texture on estimates of periphyton biomass.

2002 Texas Academy of Science Annual Conference. Impacts of municipal wastewater effluent and watershed development on sub-tropical, low-order urban streams. Poster.

American Society of Limnology and Oceanography Annual Conference. Multiple wastewater effluent discharges: stream algal productivity and composition. Poster.

Department of Wildlife and Fisheries Research Symposium, Texas A&M University. Impact of wastewater effluent and watershed development on stream hydrology, water quality, and primary production.

2001 Brazos Greenways Council, College Station, Texas. Invited presentation. The current health of Carter Creek and possible impacts of future watershed development. Invited presentation.