

TODD V. ROYER
CURRICULUM VITAE

ADDRESS:

School of Public and Environmental Affairs
Indiana University
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EDUCATION:

Post-doctoral research associate, 2000–2003. University of Illinois at Urbana-Champaign
Ph.D. in Biology, 1999. Idaho State University, Pocatello
B.S. in Animal Ecology, 1992. Iowa State University, Ames

ACADEMIC APPOINTMENTS:

2010–present Associate Professor, School of Public and Environmental Affairs, Indiana University
2005–2010 Assistant Professor, School of Public and Environmental Affairs, Indiana University
2003–2005 Assistant Professor, Department of Biological Sciences, Kent State University

PROFESSIONAL MEMBERSHIPS:

American Society of Limnology and Oceanography
Ecological Society of America
North American Benthological Society
Indiana Water Resources Association

PEER-REVIEWED PUBLICATIONS:

Griffiths, N.A., J.L. Tank, **T.V. Royer**, T.J. Warner, T.C. Frauendorf, E.J. Rosi-Marshall, and M.R. Whiles. 2011. Temporal variation in organic carbon spiraling in Midwestern agricultural streams. *Biogeochemistry* In Press. DOI 10.1007/s10533-011-9585-z

Gardner, K.M. and **T.V. Royer**. 2010. Effect of road salt application on seasonal chloride concentrations and toxicity in south-central Indiana streams. *Journal of Environmental Quality* 39:1036–1042.

Tank, J.L., E.J. Rosi-Marshall, **T.V. Royer**, M.R. Whiles, N.A. Griffiths, T.C. Frauendorf, and D.J. Treering. 2010. Occurrence of maize detritus and a transgenic insecticidal protein (Cry1Ab) within the stream network of an agricultural landscape. *Proceedings of the*

National Academy of Sciences 107:17645-17650.

- Chambers, C.P., M.R. Whiles, E.J. Rosi-Marshall, J.L. Tank, **T.V. Royer**, N.A. Griffiths, M.A. Evans-White, and A. Stojak. 2010. Responses of stream macroinvertebrates to Bt maize leaf detritus. *Ecological Applications* 20:1949-1960.
- Warrner, T.J., **T.V. Royer**, J.L. Tank, N.A. Griffiths, E.J. Rosi-Marshall, and M.R. Whiles. 2009. Dissolved organic carbon in streams from artificially drained and intensively farmed watersheds in Indiana, USA. *Biogeochemistry* 95:295–307.
- Gentry, L.E., M.B. David, F.E. Below, **T.V. Royer**, and G.F. McIsaac. 2009. Nitrogen mass balance of a tile-drained agricultural watershed in east-central Illinois. *Journal of Environmental Quality* 38:1841–1847.
- Griffiths, N.A., J.L. Tank, **T.V. Royer**, E.J. Rosi-Marshall, M.R. Whiles, C.P. Chambers, T.C. Frauendorf, M.A. Evans-White. 2009. Rapid decomposition of maize detritus in agricultural headwater streams. *Ecological Applications* 19:133–142.
- McDaniel, M.D., M.B. David, and **T.V. Royer**. 2009. Relationships between benthic sediments and water column phosphorus in Illinois streams. *Journal of Environmental Quality* 38:607–617.
- Royer, T.V.**, M.B. David, L.E. Gentry, C.A. Mitchell, K.M. Starks, T. Heatherly, and M.R. Whiles. 2008. Assessment of chlorophyll-*a* as a criterion for establishing nutrient standards in the streams and rivers of Illinois. *Journal of Environmental Quality* 37:437–447.
- Das, M., **T.V. Royer**, and L.G. Leff. 2008. Fungal communities on decaying leaves in streams: A comparison of two leaf species. *Mycological Progress* 7:267–275.
- Rosi-Marshall, E.J., J.L. Tank, **T.V. Royer**, M.R. Whiles, M. Evans-White, C. Chambers, N.A. Griffiths, J. Pokelsek, and M.L. Stephen. 2007. Toxins in transgenic crop byproducts may affect headwater streams. *Proceedings of the National Academy of Sciences* 104:16204–16208.
- Heatherly, T., M.R. Whiles, **T.V. Royer**, and M.B. David. 2007. Relationships between habitat quality, water quality, and macroinvertebrate assemblages in Illinois streams. *Journal of Environmental Quality* 36:1653–1660.
- Arango, C.P., J.L. Tank, J.L. Schaller, **T.V. Royer**, M.J. Bernot, and M.B. David. 2007. Benthic organic carbon influences denitrification in streams with high nitrate concentration. *Freshwater Biology* 52:1210–1222.
- Das, M., **T.V. Royer**, and L.G. Leff. 2007. Diversity of fungi, bacteria, and actinomycetes on leaves decomposing in a stream. *Applied and Environmental Microbiology* 73:756–767.

- Gentry, L.E., M.B. David, **T.V. Royer**, C.A. Mitchell, and K.M. Starks. 2007. Phosphorus transport pathways to streams in tile-drained agricultural watersheds. *Journal of Environmental Quality* 36:408–415.
- David, M.B., L.G. Wall, **T.V. Royer**, and J.L. Tank. 2006. Denitrification and the nitrogen budget of a reservoir in an agricultural landscape. *Ecological Applications* 16:2177–2190.
- Royer, T.V.**, M.B. David, and L.E. Gentry. 2006. Timing of riverine export of nitrate and phosphorus from agricultural watersheds in Illinois: implications for reducing nutrient loading to the Mississippi River. *Environmental Science & Technology* 40:4126–4131.
- Figueroa-Nieves, D., **T.V. Royer**, and M.B. David. 2006. Controls on chlorophyll-a in nutrient-rich agricultural streams in Illinois, USA. *Hydrobiologia* 568:287–298.
- Morgan, A.M., **T.V. Royer**, M.B. David, and L.E. Gentry. 2006. Relationships among nutrients, chlorophyll-a, and dissolved oxygen in agricultural streams in Illinois. *Journal of Environmental Quality* 35:1110–1117.
- Bernot, M.J., J.L. Tank, **T.V. Royer**, and M.B. David. 2006. Nutrient uptake in streams draining agricultural catchments of the midwestern United States. *Freshwater Biology* 51:499–509.
- Thomas, S.A., **T.V. Royer**, E.B. Snyder, and J.C. Davis. 2005. Organic carbon spiraling in an Idaho river. *Aquatic Sciences* 67:424–433.
- Royer, T.V.** and M.B. David. 2005. Export of dissolved organic carbon from agricultural streams in Illinois, USA. *Aquatic Sciences* 67:465–471.
- Wall, L.G., J.L. Tank, **T.V. Royer**, and M.J. Bernot. 2005. Spatial and temporal variability in sediment denitrification within an agriculturally influenced reservoir. *Biogeochemistry* 76:85–111.
- Schaller, J.L., **T.V. Royer**, M.B. David, and J.L. Tank. 2004. Denitrification associated with plants and sediments in an agricultural stream. *Journal of the North American Benthological Society* 23:667–676.
- Royer, T.V.**, J.L. Tank, and M.B. David. 2004. Transport and fate of nitrate in headwater agricultural streams in Illinois. *Journal of Environmental Quality* 33:1296–1304.
- Royer, T.V.** and G.W. Minshall. 2003. Controls on leaf processing in streams from spatial-scaling and hierarchical perspectives. *Journal of the North American Benthological Society* 22:352–358.
- Royer, T.V.** and G.W. Minshall. 2001. Effects of nutrient enrichment and leaf quality on the breakdown of leaves in a hardwater stream. *Freshwater Biology* 46:603–610.

- Royer, T.V.**, C.T. Robinson, and G.W. Minshall. 2001. Development of a macroinvertebrate-based index for bioassessment of Idaho rivers. *Environmental Management* 27:627–636.
- Minshall, G.W., **T.V. Royer**, and C.T. Robinson. 2001. Response of the Cache Creek macroinvertebrates during the first 10 years following disturbance by the 1988 Yellowstone wildfires. *Canadian Journal of Fisheries and Aquatic Sciences* 58:1077–1088.
- Robinson, C.T., G.W. Minshall, and **T.V. Royer**. 2000. Inter-annual patterns in macroinvertebrate communities of wilderness streams in Idaho, USA. *Hydrobiologia* 421:187–198.
- Royer, T.V.**, M.T. Monaghan, and G.W. Minshall. 1999. Processing of native and exotic leaf litter in two Idaho (USA) streams. *Hydrobiologia* 400:123–128.
- Royer, T.V.** and G.W. Minshall. 1997. Temperature patterns in small streams following wildfire. *Archiv für Hydrobiologie* 140:237–242.
- Royer, T.V.** and G.W. Minshall. 1997. Rapid breakdown of autochthonous and allochthonous plant material in a eutrophic river. *Hydrobiologia* 344:81–86.
- Minshall, G.W., C.T. Robinson, **T.V. Royer**, and S.R. Rushforth. 1995. Benthic community structure in two adjacent streams in Yellowstone National Park five years after the 1988 wildfires. *Great Basin Naturalist* 55:193–200.

PEER-REVIEWED PROCEEDINGS AND BOOK CHAPTERS:

- Minshall, G.W., **T.V. Royer**, and C.T. Robinson. 2004. Stream ecosystem responses to fire: the first ten years. Pages 165–188 in L.L. Wallace (editor), *After the fires: the ecology of change in Yellowstone National Park*. Yale University Press, New Haven, Conn.
- Thomas, S.A., **T.V. Royer**, G.W. Minshall, and E.B. Snyder. 2003. Assessing the historic contribution of marine-derived nutrients to Idaho streams. Pages 41–55 in J. G. Stockner (editor). *Nutrients in salmonid ecosystems: sustaining production and biodiversity*. American Fisheries Society, Symposium 34, Bethesda, Maryland.
- David, M.B., G.F. McIsaac, **T.V. Royer**, R.D. Darmody, and L.E. Gentry. 2001. Estimated historical and current nitrogen balances for Illinois. Pages 597–604 In: *Optimizing Nitrogen Management in Food and Energy Production and Environmental Protection: Proceedings of the 2nd International Nitrogen Conference on Science and Policy*, *TheScientificWorld* 1(S2).
- Brock, J.T., **T.V. Royer**, E.B. Snyder, S.A. Thomas. 1999. Periphyton metabolism: a chamber approach. In: R. Webb, D. Marzolf, J. Schmidt, and R. Valdez (eds.) *Floods and river management: the 1996 flood on the Colorado River in Grand Canyon*, *Geophysical*

Monograph 110, American Geophysical Union.

TEACHING EXPERIENCE:

2005–present, Indiana University

E455, Limnology
E539, Aquatic Chemistry
E272, Introduction to Environmental Science
E360, Introduction to Water Resources
E680, Environmental Science & Policy Seminar
E710, Biogeochemistry

2004–05, Kent State University

Limnology (BSCI 4/5/70364)
Stream Biology (BSCI 4/5/70170)
Basic Microbiology (BSCI 20021)

2002-03, University of Illinois at Urbana-Champaign

Aquatic Ecosystem Conservation (NRES 330)
Biogeochemistry of Forest, Agricultural, and Aquatic Ecosystems (NRES 416)

GRANTS FUNDED:

2011 RET Supplement. National Science Foundation, DEB-1110974, \$15,000

2010 Upper East Fork White Watershed Alliance - Nutrient Runoff Reduction. Decatur County (IN) Soil and Water Conservation District, \$43,430

2010 Transport and fate of pharmaceutical compounds in an Indiana stream. Indiana Water Resources Research Center, \$11,080 in federal funds and \$22,488 in matching funds.

2010 Hydrological controls on greenhouse gas emissions from agricultural landscapes: the role of artificial subsurface drainage. IU Faculty Research Support Program, \$51,000

2009 REU Supplement. National Science Foundation, DEB-0923807, \$7,000

2008–12 Interactions among dissolved organic matter, genetic structure, and denitrification in an agriculturally-influenced stream ecosystem. National Science Foundation, DEB-0743396, continuing grant with total award of \$649,000

- 2007–09 Quantifying the effect of urbanization on the physical and chemical hydrology of central Indiana watersheds. Monroe County (Indiana) Commissioners, \$96,000
- 2007–08 Quantifying organic and pharmaceutical contaminants in streams draining a central Indiana urbanizing watershed. 2006 IU Faculty Research Support Program, \$51,100
- 2004–08 Cycling of novel allochthonous carbon in Midwestern agricultural streams. National Science Foundation, DEB-0415984, \$530,000 (Co-PI with J.L. Tank, E.J. Rosi-Marshall, and M.R. Whiles)
- 2003–06 Spatial and temporal relationships between biotic integrity of Illinois streams, dissolved oxygen, and nutrients; including controls on dissolved reactive and particulate phosphorus. Illinois Council on Food and Agricultural Research, \$410,000 (Co-PI with M.B. David, M.R. Whiles, G.F. McIsaac, and R.D. Darmody)
- 2001–04 Factors controlling stream denitrification in an agricultural landscape. Watershed Processes and Water Resources panel, USDA National Research Initiative, \$315,000 (Co-PI with J.L. Tank and M.B. David)
- 2000 The role of in-stream processes in the cycling of dissolved nitrogen. Illinois Council on Food and Agricultural Research, \$66,000 (Co-PI with M.B. David)
- 1997 Influence of the Swet Creek wildfire on stream ecosystems in the Bitterroot National Forest, Idaho. ISU Faculty Research Committee, \$3,700 (with G.W. Minshall)

GRADUATE STUDENT AND POST-DOCTORAL ADVISEES:

Jessica M. Fulgoni, MS student, Indiana University, 2010–present
 Laura T. Johnson, Indiana University, post-doctoral research associate, 2008–present
 Diana M. Oviedo Vargas, Ph.D. student, Indiana University, 2008–present
 Michael P. Brennan, MS student, Indiana University, 2008–present
 Kristin M. Gardner, MS student, Indiana University, 2007–2009
 Thomas J. Warrner, MS student, Indiana University, 2006–2008
 Mitali Das, Ph.D. student, Kent State University, 2003–2006 (co-advised with L. Leff)

PROFESSIONAL ACTIVITIES:

2007–present Serving as a technical advisor for the Indiana Department of Environmental Quality to assist and advise in the development of water quality standards.

- 2003–present Provided outside review of grant proposals for the National Science Foundation, the USDA National Research Initiative, and several state water resource institutes.
- 2003–present Provided peer-review for one or more manuscripts submitted to the following journals: *Biogeochemistry*, *BioScience*, *Ecological Applications*, *Environmental Management*, *Environmental Science & Technology*, *Freshwater Biology*, *Hydrobiologia*, *Journal of Environmental Quality*, *Journal of Geophysical Research*, *Journal of the North American Benthological Society*, *Landscape Ecology*, *Limnology and Oceanography*, *Microbial Ecology*, *Oecologia*, *Science of the Total Environment*, *Water Resources Research*.
- 2008 Served on an independent review team for the Agricultural Incentives Program operated by the (non-profit) Sand County Foundation, Monona, WI.
- 2005–2006 Served on the planning committee for a regional conference on reducing non-point source pollution sponsored by The Rivers Institute and The Nature Conservancy.
- 2005 Served as guest editor of a special volume of *Aquatic Sciences* honoring the career of Professor G. Wayne Minshall on the occasion of his retirement.
- 2005 Provided outside review of a grant proposal submitted to EPA's Regional Environmental Monitoring and Assessment Program.
- 2005 Invited by Environment Canada to participate in the National Agri-Environmental Standards Initiative (NAESI) Water Workshop, Cambridge, Ontario
- 2005 Served on the Watershed Processes and Water Resources panel of the USDA CSREES competitive grants program.

INVITED SEMINARS:

- 2010 Interactions among dissolved organic matter, microbial diversity, and nitrogen cycling in an agricultural stream. Cary Institute for Ecosystem Studies, Millbrook, New York.
- 2009 Optimizing denitrification in agricultural streams. Workshop on Denitrification in Managed Ecosystems, University of Rhode Island.
- 2008 Toward nutrient standards in streams: interactions among nutrients, algae, and dissolved oxygen. Department of Earth Sciences, IUPUI.
- 2008 Developing effective and defensible nutrient standards for the streams and rivers of Illinois. National Soil Erosion Laboratory, West Lafayette, Indiana.
- 2007 Does transgenic corn pose a threat to aquatic ecosystems in the midwestern US?

Department of Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign.

- 2006 Do in-stream transformations affect nitrogen loading to the Mississippi River? Presented at the EPA-sponsored symposium: Sources, transport, and fate of nutrients in the Mississippi and Atchafalaya river basins, Minneapolis, MN.
- 2006 Temporal patterns in nutrient export from agricultural watersheds: implications for water quality in the Mississippi River. School of Natural Resources, University of Nebraska, Lincoln.
- 2005 Biogeochemistry of DOC in agricultural streams. Department of Biological, Geological and Environmental Sciences, Cleveland State University.
- 2004 Sources and fate of dissolved organic carbon in agricultural streams. Department of Zoology, Miami University of Ohio, Oxford.
- 2002 Monitoring dissolved oxygen in streams. Illinois Association of Wastewater Agencies.
- 2001 Factors controlling denitrification in agricultural streams. Biology Department, Virginia Polytechnic Institute and State University, Blacksburg.

PRESENTATIONS AT REGIONAL AND NATIONAL MEETINGS:

2011

- 2010 Effect of a labile DOC enrichment on organic carbon cycling in an agricultural stream. Annual Meeting of the North American Benthological Society, Santa Fe, New Mexico.
- 2009 Human pharmaceutical and personal care products in the streams of an urbanizing watershed: evidence of nonpoint source inputs. Annual meeting of the North American Benthological Society, Grand Rapids, Michigan.
- 2008 Towards the development of nutrient standards: Relationships among nutrients, algal biomass, and dissolved oxygen in Illinois streams and rivers. Annual meeting of the North American Benthological Society, Salt Lake City, Utah.
- 2008 Biogeochemistry of DOC in headwater agricultural streams. American Society of Limnology and Oceanography, St. John's, Newfoundland, Canada.
- 2008 Relationships among nutrients, algal biomass, and dissolved oxygen. Spring meeting of the Indiana Water Resources Association, Bloomington, Indiana.
- 2007 Is chlorophyll the appropriate indicator of nutrient enrichment in Illinois streams?

- Annual meeting of the North American Benthological Society, Columbia, South Carolina.
- 2007 Microbial community structure in headwater streams and its influence on denitrification. American Society of Limnology & Oceanography, Aquatic Sciences Meeting, Santa Fe, New Mexico.
- 2006 Nitrate and phosphorus export from agricultural watersheds in the Midwestern US. Annual meeting of the North American Benthological Society, Anchorage, Alaska
- 2006 Timing of riverine export of nitrate and phosphorus from agricultural watersheds in Illinois: Implications for reducing nutrient loading to the Mississippi River. Innovations in reducing nonpoint source pollution, Indianapolis, Indiana.
- 2005 Floods control nitrogen export from agricultural regions in Illinois: implications for nutrient loading to the Mississippi River. Mississippi River Basin Nutrient Science Workshop, St. Louis, Missouri.
- 2005 Temporal patterns in sediment denitrification rates in an agricultural stream. Annual meeting of the North American Benthological Society, New Orleans, Louisiana.
- 2005 Long-term patterns in stream export of DOC from agricultural watersheds. American Society of Limnology and Oceanography, Salt Lake City, Utah.
- 2003 Nitrate transport in agricultural streams: has denitrification been given too great a role? Annual meeting of the North American Benthological Society, Athens, Georgia.
- 2002 Energy flow in a stream ecosystem: an assessment of denitrification and oxygen metabolism. Annual meeting of the North American Benthological Society, Pittsburgh, Pennsylvania.
- 2001 Is denitrification a major sink for nitrate in agricultural streams? Annual meeting of the North American Benthological Society, La Crosse, Wisconsin.
- 2001 Denitrification rates and controls in agricultural streams in the Midwest. Annual meeting of the American Society of Limnology and Oceanography, Albuquerque, New Mexico.
- 1999 In-stream processing of leaves is not affected by pre-conditioning on the riparian floor prior to entering a hardwater, mountain stream. Annual meeting of the North American Benthological Society, Duluth, Minnesota.
- 1998 Effect of nutrient enrichment on the processing of leaf litter in a hardwater, mountain stream. Annual meeting of the North American Benthological Society, Charlottetown, PEI, Canada.
- 1998 A comparison of macroinvertebrate metrics developed for large and medium-sized

- rivers in Idaho. Annual workshop on water quality monitoring, Boise, Idaho.
- 1997 A multi-metric index for the bioassessment of large rivers in Idaho. Annual meeting of the North American Benthological Society, San Marcos, Texas.
- 1996 Land-use influences on benthic invertebrate diversity within and between watersheds of west central Idaho. Annual meeting of the North American Benthological Society, Kalispell, Montana.

TECHNICAL REPORTS:

- Royer, T.V.** 2007. Preliminary results on water chemistry in Jack's Defeat Creek during the 2007 Water Year. Report to the County Drainage Board, Monroe County, Indiana, 11 pages.
- McIsaac, G.F., **T.V. Royer**, M.B. David, D.J. Wuebbles, J.O. Dawson, and G. Sandiford. 2000. Review of Illinois State Water Survey Contract Report 2000-08: "A contribution to the characterization of Illinois reference/background conditions for setting nitrogen criteria for surface waters in Illinois." NRES Department Report Series 2000-03, University of Illinois.
- Cirone, P.A., D.W. Karna, J.R. Yearsley, C.M. Falter, and **T.V. Royer**. 2000. Ecological risk assessment for the Middle Snake River, Idaho. US EPA, Region 10, Seattle, WA, 122 pages.
- Prussian, A.M., **T.V. Royer**, and G.W. Minshall. 1999. Impact of suction dredging on water quality, benthic habitat, and biota in the Fortymile River, Resurrection Creek, and Chatanika River, Alaska. Final report to US EPA, Region 10, Seattle WA.
- Royer, T.V.**, G.W. Minshall, and K.E. Bowman. 1997. Assessment of habitat and biota in tributaries of Big Creek and the South Fork Salmon River, Payette National Forest. Report to the US Forest Service, Payette National Forest, 46 pages.
- Royer, T.V.** and G.W. Minshall. 1996. Development of biomonitoring protocols for large rivers in Idaho. Final report to the State of Idaho, Division of Environmental Quality, 55 pages.
- Royer, T.V.**, C.T. Robinson, and G.W. Minshall. 1995. Ecological structure and function of the Middle Reach of the Snake River, Volume I: Water quality and benthic biomonitoring. Final report to the State of Idaho, Division of Environmental Quality, 84 pages.