

Freya E. Rowland

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EDUCATION

- 2018 **Ph.D.** University of Missouri, Columbia, MO; Division of Biological Sciences
Advisors: Dr. Ricardo Holdo and Dr. Ray Semlitsch (deceased)
Dissertation: *The ecological role of pond-breeding amphibians*
Graduate Certificates: Conservation Biology & Science and Public Policy
- 2010 **M.S.** Miami University, Oxford, OH; Department of Biology
Advisors: Dr. Mike Vanni and Dr. María González
Thesis: *Light and nutrients differentially regulate energy transfer through experimental benthic and pelagic food chains*
- 2007 **B.S.** University of Wisconsin, Madison, WI
Majors: Biology and German
Minor: Environmental Studies
- 2004–2005 Albert-Ludwigs-Universität, Freiburg, Germany; Academic Year Abroad

PROFESSIONAL EXPERIENCE

- 2021–*present* Research Ecologist, Columbia Environmental Research Center, U.S. Geological Survey, Columbia, MO
- 2019–2021 Donnelley Postdoctoral Fellow, School of Forestry & Environmental Studies, Yale University, New Haven, CT (Lab of Dr. David Skelly)
- 2018–2019 Postdoctoral Fellow, Cooperative Institute for Great Lakes Research, Ann Arbor, MI (Mentored by Dr. Craig Stow)
- 2013–2018 Graduate Teaching and Research Assistant, Division of Biological Sciences, University of Missouri, Columbia, MO
- 2011–2013 Environmental Specialist, Mississippi Watershed Management Organization (MWMO), Minneapolis, MN
- 2011 Water Resources Technician, Capitol Region Watershed District, St. Paul, MN
- 2010–2011 Water Resources Specialist, Minneapolis Park and Recreation Board, Minneapolis, MN
- 2007–2010 Graduate Teaching and Research Assistant, Department of Biology, Miami University, Oxford, OH
- 2006–2007 Undergraduate Research Assistant, University of Wisconsin Center for Limnology (Advisor: Dr. Steve Carpenter, supervised by Drs. Amy Kamarainen and Oonsie Biggs), Madison, WI

SUBMITTED AND IN REVISION

20. **Rowland, F.E.**, E.S. Schyling, L.K. Freidenburg, M.C. Urban, J.L. Richardson, A.Z.A. Arietta, S.B. Rodrigues, A.D. Rubinstein, M.F. Bernard, and D.K. Skelly. (*under review*). Asynchrony, density dependence, and persistence in amphibian populations. *Ecology*.
19. **Rowland, F.E.**, M.L. Crump, H.H. Whiteman, W.H. Lowe, K.A. Berven, and J.H.K. Pechmann (*in revision*). Why we (still) need more long-term amphibian population data. *Ichthyology and Herpetology*.
18. **Rowland, F.E.** and R.M. Holdo (*under review*). Nonlinear ecosystem responses to leaf litter subsidies in experimental ponds. *EcoEvoRxiv* <https://ecoevorxiv.org/uwgdy/>
17. **Rowland, F.E.** and J.J. Burkhart (*in revision*). Juvenile salamanders do not exhibit compensatory growth post-metamorphosis in an experimental setting.

PEER-REVIEWED PUBLICATIONS

(*undergraduate co-authors are italicized and underlined*)

16. Qian, S.S., C.A. Stow, **F.E. Rowland**, Q. Liu, M.D. Rowe, E.J. Anderson, R.P. Stumpf, and T.H. Johengen. 2021. Chlorophyll *a* as an indicator of microcystin: Short-term forecasting and risk assessment in Lake Erie. *Ecological Indicators* 130: 108055. <https://doi.org/10.1016/j.ecolind.2021.108055>
15. **Rowland, F.E.**, C.A. Stow, L.T. Johnson, and R.M. Hirsch. 2021. Lake Erie tributary nutrient trend evaluation: normalizing concentrations and loads to reduce flow variability. *Ecological Indicators* 125: 107601. <https://doi.org/10.1016/j.ecolind.2021.107601>
14. Anderson, T.L., B.H. Ousterhout, **F.E. Rowland**, D.L. Drake, J.J. Burkhart, and W.E. Peterman. 2021. Direct effects influence larval salamander size and density more than indirect effects. *Oecologia* 195: 173–186. <https://doi.org/10.1007/s00442-020-04820-8>
13. **Rowland, F.E.**, C.A. Stow, T.H. Johengen, A.M. Burtner, D. Palladino, D.C. Gossiaux, T.W. Davis, L.T. Johnson, and S.A. Ruberg. 2020. Recent patterns in Lake Erie phosphorus concentrations in response to changing loads. *Environmental Science & Technology* 54: 835-841. <https://doi.org/10.1021/acs.est.9b05326>
12. *Holtswarth, J.N.*, **F.E. Rowland**, H.J. Puglis, M.L. Hladik, and L.B. Webb. 2019. Effects of the neonicotinoid insecticide clothianidin on southern leopard frog (*Rana sphenocephala*) tadpole behavior. *Bulletin of Environmental Contamination and Toxicology* 103: 717-722. <https://doi.org/10.1007/s00128-019-02703-0>
11. **Rowland, F.E.**, R.L. North, P. McEachern, D.V. Obrecht, T.B. Gurung, S.B. Jones, and J.R. Jones. 2019. Nutrient deficiencies vary with season in sub-tropical lakes of Nepal. *Hydrobiologia* 833(1): 157-172. <https://doi.org/10.1007/s10750-019-3897-8>
10. *Watters, A.M.*, **F.E. Rowland**, and R.D. Semlitsch. 2018. Larval salamanders are as effective at short-term mosquito predation as mosquitofish. *Canadian Journal of Zoology* 96(10): 1165-1169. <https://doi.org/10.1139/cjz-2017-0267>

9. Peterman, W.E., T.L. Anderson, B.H. Ousterhout, D.L. Drake, J.J. Burkhart, **F.E. Rowland**, and R.D. Semlitsch. 2018. Using spatial demographic network models to optimize habitat creation, restoration, and preservation. *Journal of Wildlife Management* 82(3): 649-659. <https://doi.org/10.1002/jwmg.21393>
8. Anderson, T.L., **F.E. Rowland**, and R.D. Semlitsch. 2017. Asymmetric effects of phenological shifts and larval density on intraguild predation between salamanders. *Oecologia* 185(3): 475-486. <https://doi.org/10.1007/s00442-017-3954-9>
7. Burkhart, J.J., W.E. Peterman, *E. Brocato*, *K. Romine*, *M.M. Willis*, B.H. Ousterhout, T.L. Anderson, D.L. Drake, **F.E. Rowland**, R.D. Semlitsch, and L. Eggert. 2017. The influence of breeding phenology on the genetic structure of four pond-breeding salamanders. *Ecology and Evolution* 7(13): 4670-4681. <https://doi.org/10.1002/ece3.3060>
6. **Rowland, F.E.**, *M.B. Rawlings*, and R.D. Semlitsch. 2017. Joint effects of resources and amphibians on pond ecosystems. *Oecologia* 183(1): 237-247. <https://doi.org/10.1007/s00442-016-3748-5>
5. Anderson, T.L., B.H. Ousterhout, D.L. Drake, J.J. Burkhart, **F.E. Rowland**, W.E. Peterman, and R.D. Semlitsch. 2016. Differences in larval allometry among three ambystomatid salamanders. *Journal of Herpetology* 50(3): 464-470. <https://doi.org/10.1670/15-178>
4. **Rowland, F.E.**, *S.K. Tuttle*, M.J. González, and M.J. Vanni. 2016. Canopy cover and anurans: nutrients, not light, are the most important predictor of growth and development. *Canadian Journal of Zoology* 94: 225–232. <https://doi.org/10.1139/cjz-2015-0022>
3. **Rowland, F.E.**, *K.J. Bricker*, M.J. Vanni, and M.J. González. 2015. Light and nutrients regulate energy transfer through benthic and pelagic food chains. *Oikos* 124(12): 1648–1663. <https://doi.org/10.1111/oik.02106>
2. Schussler, E.E., **F.E. Rowland**, C.A. Distel, J.M. Bauman, M.L. Keppler, Y. Kawarasaki, M.R. McCarthy, A. Glover, and H. Salem. 2011. Promoting the Development of Graduate Student Teaching Philosophy Statements. *Journal of College Science Teaching* 40(3): 32-35.
1. Kamarainen, A.M., **F.E. Rowland**, R. Biggs, and S.R. Carpenter. 2008. Zooplankton and the Total Phosphorus-Chlorophyll *a* Relationship: Hierarchical Bayesian Analysis of Measurement Error. *Canadian Journal of Fisheries and Aquatic Sciences* 65: 2644-2655. <https://doi.org/10.1139/F08-161>

PROFESSIONAL PUBLICATIONS AND REPORTS

Eggert, L.S., R.D. Semlitsch, T.L. Anderson, J.J. Burkhart, A. Messerman, B.H. Ousterhout, W.E. Peterman, **F.E. Rowland**. 2015. Multi-Scale Approach to Understanding Source-Sink Dynamics of Amphibians. SERDP RC-2155.

Rowland, F.E. 2015. R – A free solution for statistics and graphing. *Stormwater Journal* 16(2): 10-11.

Rowland, F.E. 2014. The Statistics Behind BMP Monitoring. *Stormwater Journal* 15(3): 10-11.

Oquist, K., **F.E. Rowland**, U.B. Singh and B. Jastram. 2013. Annual Monitoring Report 2012. MWMO Watershed Bulletin 2013-1. 68 pp.

Oquist, K., **F.E. Rowland**, U.B. Singh and B. Jastram. 2012. Annual Monitoring Report 2011. MWMO Watershed Bulletin 2012-1. 66pp.

Environmental Operations Staff. 2011. 2010 Water Resources Report. Minneapolis Park and Recreation Board. 308pp.

TEACHING EXPERIENCE

- Spring 2018 Guest Lecturer in Evolution and Genetics in Conservation, School of Natural Resources, University of Missouri
- Spring 2017 Guest Lecturer in Aquatic Community Ecology, School of Natural Resources, University of Missouri
- 2013–2014, Spring 2016
Spring 2017–Spring 2018 Instructor of Record
Biology Lab for Non-Majors (Biology 1020)
- Primary instructor to two sections of 20-24 students
 - Instructed lab and discussion sections
 - Wrote exam questions
 - Led review sessions
- Spring 2015 Guest Lecturer in Environmental Studies, Westminster College, Fulton, MO
- Fall 2014, 2015, 2016 Lab Teaching Assistant
Ecology Lab (Biology 3650)
- Lab instructor to 10-20 students
 - Writing intensive course
 - Emphasized data analysis and scientific writing skills
- Fall 2008, 2009 Lab Teaching Assistant
Limnology Lab (Zoology 463/563)
- Co-designed lab experiments for 15 undergraduate and graduate students
 - Prepped materials for labs
 - Writing intensive course
- Fall 2007–Spring 2008 Lab Teaching Assistant
Biology Lab for Majors (Botany/Microbiology/Zoology 115 & 116)
- Taught two sections of 20-25 students each
 - Wrote, administered, and graded lab exams

UNDERGRADUATE MENTEES

Jordan Holtswarth – University of Missouri, College of Agriculture, Food and Natural Resources Research Internship Awardee 2016-2017: *Do neonicotinoids affect the behavior of larval pond-breeding amphibians?*

Amanda Watters – University of Missouri, Arts and Sciences Undergraduate Research Mentorship Awardee 2015: *Comparisons of mosquito control by fish, salamander larvae and tadpoles*

Madelyn Rawlings – University of Missouri, College of Agriculture, Food and Natural Resources Research

Internship Awardee 2014-2015: *Amphibians promote zooplankton diversity in pond communities*

Annelies Brock – University of Missouri, Life Sciences Undergraduate Research Opportunity Program
Awardee 2014: *How variation in light and nutrient levels of the natal environment affects the growth and body nutrient levels of amphibians*

Sara Tuttle – Miami University, Independent Study 2009-2010: *Food quality affects tadpole phenotypic plasticity in experimental enclosures*

Kelley Bricker – Miami University, Undergraduate Research Awardee 2008-2009: *The effects of light and nutrient supply on algal photosynthetic parameters*

SYMPOSIUM AND CONFERENCE ORGANIZATION

- 2017 Co-organizer, Great Plains Limnology Meeting, Columbia, MO
2016 Co-organizer, Special Symposium—*The Science, Management, and Policy of Amphibian Conservation: Extending the Legacy of Ray Semlitsch*, 2017 Joint Meeting of Ichthyologists and Herpetologists, Austin, TX

INVITED SEMINARS

- 2020 Louisiana Tech University, Ruston, LA
2020 Yale Institute for Biospheric Studies, New Haven, CT
2018 University of Toledo, Department of Biology, Toledo, OH
2017 Great Lakes Environmental Research Lab, Ann Arbor, MI

CONTRIBUTED ORAL PRESENTATIONS

(*undergraduate co-authors are italicized and underlined*)

Rowland, F.E., D.K. Skelly. Jan 2021. Synchrony, density dependence, and persistence in amphibian populations. Oral Presentation at Virtual Asilomar.

Rowland, F.E., C.A. Stow, T.H. Johengen. Jun 2019. Subtle changes in Lake Erie water quality 2008–2018. Oral Presentation at the International Association of Great Lakes Research Meeting, Brockport, NY

Rowland, F.E., *M.B. Rawlings*, R.D. Semlitsch. Aug 2017. Tadpoles and light availability regulate zooplankton in experimental ponds. Oral Presentation at the Ecological Society of America Conference, Portland, OR

Rowland, F.E. Jul 2017. The ecological role of pond-breeding amphibians. Symposium Presentation at the Joint Meeting of Ichthyologists and Herpetologists, Austin, TX

Rowland, F.E., T.L. Anderson, J.J. Burkhart, B.H. Ousterhout, D.L. Drake, A.F. Messerman, and R.D. Semlitsch. Feb 2017. Predicting amphibian diversity using pond water quality. Oral Presentation at the Missouri Natural Resources Conference, Osage Beach, MO

Rowland, F.E., T.L. Anderson, J.J. Burkhart, B.H. Ousterhout, D.L. Drake, A.F. Messerman, and R.D. Semlitsch. Jul 2016. Nutrient Concentrations, Slope, and Area Predict Amphibian Richness in Intermediate-Sized Ponds. Lightning Presentation at the Joint Meeting of Ichthyologists and Herpetologists, New Orleans, LA

Rowland, F.E. and R.D. Semlitsch. Aug 2015. Light, nutrients and community affect amphibian

development and growth in experimental pond systems. Oral Presentation at the Ecological Society of America Meeting, Baltimore, MD

Rowland, F.E., *K.J. Bricker*, M.J. González, M.J. Vanni. Aug 2009. Light and nutrient availability affects food chain efficiency in benthic and pelagic aquatic food chains. Oral Presentation at the Ecological Society of America Meeting, Albuquerque, NM

Rowland, F.E., *K.J. Bricker*, M.J. González, M.J. Vanni. May 2009. Light and nutrient variation affect food quality and food chain efficiency in experimental aquatic food chains. Oral Presentation at the Great Lakes Regional Biogeochemistry Symposium, Kellogg Biological Station, Michigan State University

POSTER PRESENTATIONS

(undergraduate coauthors are italicized and underlined)

Rowland, F.E., and D.K. Skelly. Oct 2020. Synchrony, density dependence, and persistence in amphibian populations. Virtual Poster Presentation at Student Conference on Conservation Science-New York.

Rowland, F.E., R.L. North, P. McEachern, D.V. Obrecht, T.B. Gurung, S.B. Jones, and J.R. Jones. Oct 2017. Nutrient deficiencies vary with seasonality in sub-tropical lakes of Nepal. Poster Presentation at the Great Plains Limnology Meeting, Columbia, MO

Rowland, F.E., R.M. Holdo and R.D. Semlitsch. Aug 2016. Leaf litter subsidy gradients differentially influence pond ecosystem properties. Poster Presentation at the Ecological Society of America Meeting, Ft. Lauderdale, FL

Rowland, F.E., R.M. Holdo and R.D. Semlitsch. Jul 2016. Leaf litter subsidy gradients differentially influence pond ecosystem properties. Poster Presentation at the Joint Meeting and Ichthyologists and Herpetologists, New Orleans, LA

Watters, A.M., F.E. Rowland, and R.D. Semlitsch. Apr 2016. Are Larval Salamanders and Tadpoles Effective Mosquito Predators like Mosquitofish? Poster Presentation at Life Sciences Week, Columbia, MO.

Rawlings, M.B., F.E. Rowland, A.D. Brock and R.D. Semlitsch. Apr 2015. How do tadpoles and salamanders influence zooplankton communities? Poster Presentation at the Undergraduate Research Fair, Columbia, MO

Rowland, F.E., and R.D. Semlitsch. Feb 2015. Tadpoles and larval salamanders respond differentially to light and nutrient manipulation. Poster Presentation at the Wisconsin Wetlands Association Meeting, Madison, WI

Brock, A.D., F.E. Rowland, M.B. Rawlings and R.D. Semlitsch. Jul 2014. How variation in light and nutrient levels of the natal environment affects the growth of amphibians. Poster Presentation at the Undergraduate Research Forum, Columbia, MO

SCHOLARSHIPS, GRANTS, AND AWARDS

Grants and Awards (Total = \$151,840)

2021 Yale Natural Lands Grant, Yale University (\$10,000)

2019 Donnelley Postdoctoral Environmental Fellowship, Yale University (\$119,000)

- 2017 Graduate Student Association Outstanding Graduate Student Nominee, University of Missouri Graduate Student Association
- 2017 Sandra K. Abell Science Education Award Nominee, University of Missouri
- 2016 Ethel Sue Lumb Award for Excellence in Graduate Studies, Division of Biological Sciences (\$2,000)
- 2016 Trans World Airlines Scholarship 2016-2017 (\$7,000)
- 2016 E.E. Williams Grant, Herpetologists' League (\$1,000)
- 2016 Chicago Herpetological Society Grant (\$1,000)
- 2015 Trans World Airlines Scholarship 2015–2016 (\$7,000)
- 2009 Miami University Summer Field Workshop Grant, Department of Zoology, MU (\$1,595)
- 2008 Summer Field Workshop Grant, Department of Zoology, MU (\$3,245)

Travel Awards

- 2017 University of Missouri Graduate Professional Council Travel Award (\$300)
- 2017 Travel Award, Enhancing Linkages between Mathematics and Ecology Workshop (Michigan State University; \$500)
- 2016 Graduate Student Travel Award, ESA Aquatic Ecology Section (\$300)
- 2016 Travel Award, Graduate Workshop on Environmental Data Analytics (National Center for Environmental Research (tuition and room covered)
- 2015 Travel Award, Enhancing Linkages between Mathematics and Ecology Workshop (Michigan State University; \$1000)
- 2014 Travel Award, Enhancing Linkages between Mathematics and Ecology Workshop (Michigan State University; \$500)

WORKSHOPS, TRAINING & SKILLS

Science communication workshops:

National Science Foundation, Decoding Science Communication Training Program, University of Missouri, Spring 2017. *Instructors: Suzanne Burgoyne, Bimal Balakrishnan, Jack Schultz, and Jon Stemmie.*

Statistical and modeling workshops:

Agent-Based Modeling, Humboldt State University, July 2020. *Instructors: Drs. Volker Grimm and Steve Railsback*

Stochastic Modeling. Enhancing Linkages between Mathematics and Ecology, Michigan State University, July 2017. *Instructor: Dr. Kevin Gross, NC State*

Graduate Workshop on Environmental Data Analytics, National Center for Atmospheric Research, July 2016. *Instructors: Drs. Doug Nychka, Institute for Mathematics Applied to Geosciences, NCAR; Alix Gitelman, Oregon State University; and Andrew Finley, Michigan State University*

Maximum Likelihood Analysis in Ecology. Enhancing Linkages between Mathematics and Ecology, Michigan State University, June 2015. *Instructor: Dr. Colin Kremer, Yale*

Modeling Systems with Causal Networks (Structural Equation Modeling). Enhancing Linkages between Mathematics and Ecology, Michigan State University, June 2014. *Instructor: Dr. Don Schoolmaster, USGS*

Water Quality Modeling with P8. University of Minnesota Erosion and Stormwater Management Program, January 2011.

Additional Training:

Inclusion, Diversity, and Equity Workshops for Biological Sciences Graduate Students (three-part series)

PROFESSIONAL MEMBERSHIPS

- International Association of Great Lakes Research (2019–*present*)
- Association for the Sciences of Limnology and Oceanography (2020–*present*)
- Ecological Society of America (2007–2010, 2015–*present*)
- Herpetologists' League (2013–*present*)
- Chicago Herpetological Society (2013–2014, 2015–2018)
- Society for the Study of Amphibians and Reptiles (2015–2018)
- American Society of Ichthyologists and Herpetologists (2015–2018)

SERVICE AND LEADERSHIP

Service

- Associate Editor, Journal of Herpetology (2019–*present*)
- Yale Fieldwork and Off-Campus Research Committee (2020–2021)
- Doctoral/Postdoctoral Committee Representative for Yale School for the Environment (2020–2021)
- Reviewer for the following journals:

Ecology	Oecologia
Journal of Herpetology	Wetlands
Hydrobiologia	Journal of Great Lakes Research
Diversity	Biological Control
Herpetological Conservation and Biology	Water
Ecological Research	Food Webs
Journal of Animal Ecology	Environmental Science & Technology
Limnology and Oceanography	Freshwater Science
Freshwater Science	Water Research

Leadership

- Greeley Lab Agraphia Writing Group, Founder (2019–*present*)
- Women in Science at Yale mentor to graduate women (2019–2021)
- Mentor Training Course for Postdocs, Yale (2020)
- Graduate Student Representative, Ecology Faculty Search Committee, Division of Biological Sciences, University of Missouri, (2017–2018)
- Secretary (2015–2017), University of Missouri Biology Graduate Student Association

Volunteer activities

- Science fair judge for elementary and middle school science fairs in Columbia, MO (2016)
- First Lego League Project Judge, Columbia MO (2016)
- Columbia Independent School guest lecture on science careers (2017)