Freya E. Rowland

U.S. Geological Survey
Columbia Environmental Research Center
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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

2022-*present* Adjunct Faculty, School of Natural Resources, University of Missouri, Columbia, MO

2021-*present* Research Ecologist, Columbia Environmental Research Center, U.S. Geological Survey, Columbia, MO

2019–2021 Donnelley Postdoctoral Fellow, School for the Environment, 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

= CO-FIRST AUTHORS

37. **Rowland, F.E.**, C.G. Byrd, and P.T. Kroboth. (*submitted)*. Thiaminase I activity is high in grass and silver carp, but negligible in bighead and black carp. Journal of Great Lakes Research.

36. Bundschuh, M., B.M. Creel, C.J. Kotalik, J.M. Kraus, J.D. Muehlbauer, B.G. Perrotta, **F.E. Rowland**, R. Schulz, D.M. Walters, and J. Wesner (*in prep*). Contaminant spiraling as a unifying conceptual model for predicting fate and effects of contaminants on aquatic-terrestrial meta-ecosystems.

35. *Ludwig, J., T. Lipscomb, N. Mantua, C. Jeffres, R.C. Johnson, J. Field, B. Finney, S. Foott, K. Kwak, D. Tillitt, **F. Rowland**, T. Williams, A. Ward, J. Rinchard (*submitted).* Diet assessment of California salmonids following the detection of thiamine deficiency. Conservation Physiology.

34. Kraus, J., **F.E. Rowland**, M. Hladik, K. Dowdy, and M. Chumchall. (*in revision)*. Predictors of mercury and pesticide fluxes by emerging adult aquatic insects from Prairie Pothole wetlands. Environmental Toxicology and Chemistry.

33. **Rowland, F.E.**, M.J. Vanni, N.M. Hayes, C.E. Kraft. (*in revision*) Potential thiamine deficiency of phytoplankton across a productivity gradient and seasons in Ohio lakes. Freshwater Biology.

32. **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.

31. **Rowland, F.E.** and R.M. Holdo (*in prep*). Nonlinear ecosystem responses to leaf litter subsidies in experimental ponds. EcoEvoRxiv https://ecoevorxiv.org/uwgdy/

PEER-REVIEWED PUBLICATIONS

(*undergraduate co-authors are italicized and underlined, graduate students denoted with *, co-first denoted with* =)

30. Kotalik, C.J., **F.E. Rowland**, B.G. Marcot, K.E. Skrabis, D.M. Walters, J.E. Hinck, W.H. Clements, E. Richer, J. Isanhart. (*accepted*). Causal networks to inform decisions for ecological

restoration. Environmental Management.

29. =Krabbenhoft, C., =J.S. Rogosch, and =**F.E. Rowland**. 2025. Long-term regime shifts in xeric ecoregion climate and freshwater fish assemblages. Ecology and Evolution 15(9): e72067. https://doi.org/10.1002/ece3.72067.

28. Mantua, N.J., *H. Bell, A.E. Todgham, M.E. Daniels, J. Rinchard, J.M. Ludwig, J.C. Field, S.T. Lindley, **F.E. Rowland,** C.A. Richter, D.M. Walters, B. Finney, H.A.R. Distajo, D.E. Tillitt, D.C. Honeyfield, T. Lipscomb, K. Kwak, J. Kindopp, D. Cocherell, *A. Ward, T.H. Williams, J. Harding, N.A. Fangue, C.A. Jeffres, R.I. Ruiz-Cooley, S. Litvin, J.S. Foott, M. Adkison, B. Kormos, P. Harte, F. Colwell, C.P. Suffridge, *K.C. Shannon, A. Cranford, C. Ambrose, A.N. Reed, R.C. Johnson. 2025. Widespread thiamine deficiency in California salmon linked to an anchovy-dominated marine prey base. Proceedings of the National Academy of Sciences. https://doi.org/10.1073/pnas.2426011122

27. Gould, E., H.S. Fraser, T.H. Parker, S. Nakagawa, S.C. Griffith, P.A. Vesk, F. Fidler, R.N. Abbey-Lee, ..., **F.E. Rowland** ..., R.A Zitomer. 2025. Same data, different analysts: variation in effect sizes due to analytical decisions in ecology and evolutionary biology. BMC Biology 23(35). https://doi.org/10.1186/s12915-024-02101-x

26. =Harder, A.M., =A.N. Reed, and =**F.E. Rowland**. 2025. Evolutionary perspectives on thiamine supplementation of managed Pacific salmonid populations. Canadian Journal of Fisheries and Aquatic Sciences 82: 1-10. https://doi.org/10.1139/cjfas-2024-0109

25. *Orrick, K., *N.R. Sommer, **F.E. Rowland**, and *K.M. Ferraro. 2024. Disentangling the role of predator hunting mode, spatial domain size, and habitat complexity: An examination of consumptive and nonconsumptive effects. Ecology e4316. https://doi.org/10.1002/ecy.4316

24. =**Rowland, F.E., =**C.J. Kotalik, B.G. Marcot, J.E. Hinck, and D.M. Walters. 2024. A novel approach to assessing natural resource injury with Bayesian networks. Integrated Environmental Assessment and Management 20(2): 562-573. https://doi.org/10.1002/ieam.4836

23. **Rowland, F.E.**, D.E. Tillitt, C.A. Richter, and D.M. Walters. 2023. Evolutionary and ecological correlates of thiaminase in fishes. Scientific Reports 13: 18147. https://doi.org/10.1038/s41598-023-44654-x

22. *Alshwairikh, Y.A., *A.C. Fanton, *K.A. Prats, *M.K. Burak, M.C. Duguid, **F.E. Rowland**. 2023. Habits and attitudes towards writing affect the publication output of environmental biology trainees. Ecosphere 14(10): e4664. https://doi.org/10.1002/ecs2.4664

21. **Rowland, F.E., *** K.A. Prats, *Y.A. Alshwairikh, *M.K. Burak, *A.C. Fanton, and M.C. Duguid. 2023. Overemphasis on publications may disadvantage historically excluded groups in STEM before and during COVID-19: A North American survey-based study. PLOS ONE 18(9): e0291124. https://doi.org/10.1371/journal.pone.0291124

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20. **Rowland, F.E.**, E. Muths, C.A. Eagles-Smith, C.A. Stricker, J.M. Kraus, R. Harrington, and D.M. Walters. 2023. Complex life histories alter patterns of Hg exposure and accumulation in linked aquatic-terrestrial food webs: an amphibian example. Environmental Science & Technology 57(10): 4133-4142. https://doi.org/10.1021/acs.est.2c04896

19. Reed, A.N., **F.E. Rowland**, J.A. Krajcik, and D.E. Tillitt. 2023. Thiamine supplementation improves survival and body condition of hatchery-reared steelhead (*Oncorhynchus mykiss*) in Oregon. Veterinary Sciences 10(2): 156. https://doi.org/10.3390/vetsci10020156

18. **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. 2022. Asynchrony, density dependence, and persistence in amphibian populations. Ecology 103(7): e3696. https://doi.org/10.1002/ecy.3696

17. **Rowland, F.E.** and J.J. Burkhart. 2022. Juvenile salamanders do not exhibit compensatory growth post-metamorphosis in an experimental setting. Ichthyology and Herpetology 110(2): 292–298. https://doi.org/10.1643/h2021067

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

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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. Semlistch. 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. Variation in phenology and density differentially affects predator-prey interactions 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

PRESS RELEASES AND ARTICLES RELATED TO RESEARCH AND OUTREACH

18 Aug 2025 UC Davis Magazine Statewide Study Taps 3,000 Students for Salmon Research | UC Davis

25 Jun 2025 Anchovy dominated diets off the West Coast pose new dangers for salmon: Lack of key vitamin turns fatal for as many as half of salmon offspring: Anchovy Dominated Diets off the West Coast Pose New Dangers for Salmon | UC Davis

28 Aug 2024 NCEAS News and Features. Bon appetit! 2025 Morpho Working Groups address global fishing trade and fisheries nutrition

Spring 2024 Northern Woodlands Magazine Managing Vernal Pools | Spring 2024 | Knots and Bolts | Knots and Bolts

28 Oct 2020 Researchers Probe Deaths of Central Valley Chinook, with Possible Ties to Ocean Changes | NOAA Fisheries

DATA RELEASES

Rowland, F.E., Kraus, J.M., Hladik, M.L., Dowdy, K., and Chumchal, M.M, 2025, Mercury in emergent odonates and midges of the Prairie Pothole wetlands of North Dakota, USA: U.S. Geological Survey data release, https://doi.org/10.5066/P13RTBWK

Rowland, F.E., Muths, E.M., Eagles-Smith, C.A., Stricker,C.A., Kraus, J.M., Harrington, R.A., and Walters, D.M., 2022, Total mercury, methylmercury, and isotopic composition in various life stages of boreal chorus frogs (*Pseudacris maculata*) at two subalpine ponds in the Rocky Mountains, CO, USA, 2015: U. S. Geological Survey data release, https://doi.org/10.5066/P928IIOS

Reed, A.N., **Rowland, F.E.**, Krajcik, J.A., and Tillitt, D.E., 2023, Egg thiamine content, length, weight and survival of steelhead (*Oncorhynchus mykiss*) exposed to three methods of experimental thiamine supplementation in 2022 and egg thiamine content from three Oregon hatcheries in 2019: U.S. Geological Survey data release, https://doi.org/10.5066/P9KDEUBK

Rowland, F.E., Kotalik, C.J, and Marcot, B.G. 2023, Assessing Environmental Injury - Main Model. Bayesian Network Modelling Association, http://doi.org/10.59381/mdvbebcutk

Alshwairihk, Y., **Rowland, F.**, Prats, K., Burak, M., Fanton, A.C., Duguid, M. 2023, Survey: Trainee attitudes towards scientific writing [Dataset]. Dryad, https://doi.org/10.5061/dryad.fqz612jwn

Rowland, F.E., Schyling, E., Freidenburg, L.K., Urban, M., Richardson, J., Arietta, A.Z.A., Rodrigues, S., Rubinstein, A., Bendard, M., Skelly, D. 2022. Data from: Asynchrony, density dependence, and persistence in an amphibian [Dataset]. Dryad, https://doi.org/10.5061/dryad.0cfxpnw3r

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.

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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

Fall 2025	General Biology (Miami University, instructor of record)
Spring 2025	Ask a scientist, Salmon in the Classroom, California (9-12 grade students from historically underrepresented backgrounds in STEM) Guest Lecturer in Water Quality and Natural Resources Management, University of Missouri
Spring 2024	Author Q&A, Ecotoxicology Seminar, SUNY ESF Ask a scientist, Salmon in the Classroom, California (9-12 grade students from historically underrepresented backgrounds from four schools)
Spring 2023	Guest Lecturer in Aquatic Ecology, St Louis University Guest Lecturer in Water Quality and Natural Resources Management, University of Missouri
Fall 2022	Guest Lecturer in Lake Ecology, School of Natural Resources, University of Missouri
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

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- 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

2025 Co-organizer, accepted session "Tides of stress: Physiological responses and resiliency of aquatic organisms to environmental stress across freshwater and coastal ecosystems," Society for Freshwater Science 2025, Puerto Rico
2024 Lead organizer, special session "Thiamine deficiency in fishes: a symptom of dysfunctional aquatic ecosystem," World Fisheries Congress 2024, Seattle, WA
2023 Co-organizer, special session "Restoring Great Lakes Areas of Concern: Innovative Approaches to Assessment," International Association of Great Lakes Research Annual Meeting, Toronto, Canada
2017 Co-organizer, Great Plains Limnology Meeting, Columbia, MO
2017 Co-organizer, Special Symposium–*The Science, Management, and Policy of Amphibian Conservation: Extending the Legacy of Ray Semlitsch*, Joint Meeting of Ichthyologists and Herpetologists, Austin, TX

INVITED SEMINARS

2025 Colorado State University, Fort Collins CO (March 2025)
2024 Linnaeus University, Kalmar Sweden (September 2024)
2024 Wildlife Disease Community of Practice Panelist (USGS, online August 2024)
2024 NOAA Southwest Fisheries Science Center, Santa Cruz, CA
2023 Saint Louis University, Department of Biology, St. Louis, MO
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 (ONLY INCLUDES TALKS AS PRESENTER PRE-2023)

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

***Rowland, F.E.**, C.A. Nichols, S.J. Spangler, D.M. Walters, and D.E. Tillitt. May 2024. Potential thiamine (vitamin B1) deficiency across life stages of shortnose and Lost River suckers. Oral presentation (*invited*) at Annual Klamath River Fish Health Workshop. Yreka, CA. May 2024.

***Rowland, F.E.,** J. Ludwig, J. Field, D.M. Walters, R.C. Johnson, C. Jeffres, N. Mantua, D.E. Tillitt, J. Rinchard. 2024. Baseline Forage Fish Nutritional Quality in the California Current Ecosystem. Presentation at the Salmonid Restoration Conference, Santa Rosa, CA March 2024.

***Rowland, F.E.,** A. Harder, A. Reed, W. Ardren. March 2024. To B1 or not to B1: Evolutionary perspectives on salmonid thiamine supplementation. Presentation at World Fisheries Congress, Seattle WA March 2024.

*Tillitt, D.E., D. Honeyfield, J. Rinchard, C.A. Richter, A. Harder, **F.E. Rowland**, M. Futia, and J.D. Fitzsimmons. March 2024. Critical Evaluation of Causal Factors for Thiamine Deficiency in Fish Populations. Presentation at World Fisheries Congress, Seattle WA March 2024.

*Mantua, N., R.C. Johnson, J. Field, S. Lindley, T. Williams, J. Harding, A. Todgham, N. Fangue, C.

Jeffres, H. Bell, A. Ward, D. Cocherell, J. Rinchard, J. Ludwig, D.E. Tillitt, **F.E Rowland**, C.A. Richter, D.M. Walters, D. Honeyfield, T. Lipscomb, S. Foott, K. Kwak, M. Adkison, A. Dean, B. Kormos, F. Colwell, C. Suffridge, K. Shannon, and M. Daniels. March 2024. Widespread thiamine deficiency found in California salmon. Presentation at World Fisheries Congress, Seattle WA March 2024.

*Nichols, C.M., **F.E. Rowland**, D.M. Walters, D.E. Tillitt. March 2024. Potential thiamine (vitamin B1) deficiency across life stages of shortnose and Lost River suckers. Presentation at World Fisheries Congress, Seattle WA March 2024.

Rowland, F.E., J. Ludwig, J. Field, D.M. Walters*, R.C. Johnson, C. Jeffres, N. Mantua, D.E. Tillitt, J. Rinchard. 2024. Baseline Forage Fish Nutritional Quality in the California Current Ecosystem. Presentation at World Fisheries Congress, Seattle WA March 2024.

*Reed, A., **F.E. Rowland**, D.M. Walters. March 2024. Surveillance of egg thiamine status of salmonids in Oregon. Presentation at World Fisheries Congress, Seattle WA March 2024.

*Ludwig, J., T. Lipscomb, N. Mantua, C. Jeffres, R.C. Johnson, J. Field, B. Finney, S. Foott, K. Kwak, D. Tillitt, **F. Rowland**, T. Williams, A. Ward, J. Rinchard. March 2024. Assessing diet of thiamine deficient California Chinook salmon using fatty acid signatures. Presentation at World Fisheries Congress, Seattle WA March 2024.

Rowland, F., and Moore, A.P., 2024, Data Management for 400 points, please: in: Office of Restoration and Damage Assessment Office Science Seminar, Virtual Meeting

*Marcot, B., **F. Rowland**, C. Kotalik, J.E. Hinck, D. Walters. Nov 2023. Bayesian networks for assessing natural resource injury: a new framework for a major U.S. National Program. Oral Presentation at the Bayesian Network Modelling Association Meeting 2023. Brisbane, Australia.

*Deary, AD, C Pinger, C Parker-Graham, R Twibell, **F. Rowland**, D. Tillitt, J. Rinchard, R. Johnson, N. Mantua, D. Honeyfield. October 2023. A working group to promote data standardization to address thiamine deficiency in Pacific salmonids. PICES Meeting

*Ludwig, J., T. Lipscomb, N. Mantua, C. Jeffres, R.C. Johnson, J. Field, B. Finney, S. Foott, K. Kwak, D. Tillitt, **F. Rowland**, T. Williams, A. Ward, J. Rinchard. Aug 2023. Assessing diet of thiamine deficient California Chinook salmon using fatty acid signatures. Oral Presentation at the American Fisheries Society Meeting. Grand Rapids, MI.

***Rowland, F.E.**, C.A. Nichols, S.J. Spangler, D.M. Walters. June 2023. Potential thiamine (vitamin B1) deficiency across life stages of shortnose and Lost River suckers. Oral Presentation at the Society for Freshwater Science Meeting in Brisbane, Australia.

*Krabbenhoft, C.A., J.S. Rogosch, **F.E. Rowland**, M. Lauck. June 2023. Increasing intercontinental hydrologic and climatic variability are altering freshwater fish assemblages. Oral

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Presentation at the Society for Freshwater Science Meeting in Brisbane, Australia.

***Rowland, F.E.,** C.A. Stow, L.T. Johnson, R.M. Hirsch. May 2023. Normalizing Lake Erie tributary concentrations and loads to reduce flow variability. Oral Presentation at the International Association of Great Lakes Research Meeting in Toronto, Canada.

***Rowland, F.E.**, C.A. Nichols. Nov 2022. Potential thiamine (vitamin B1) deficiency across life stages of shortnose and Lost River suckers. Oral Presentation at the Klamath Basin Monitoring Program Meeting, Yreka, CA (remote attendee)

***Rowland, F.E.**, D.E. Tillitt, C.A. Richter, D.M. Walters. Aug 2022. Evolutionary and ecological correlates of thiaminase in fishes. Oral Presentation at the American Fisheries Society Meeting, Spokane, WA

***Rowland, F.E.**, D.E. Tillitt, C.A. Richter, D.M. Walters. May 2022. Ecological determinants of thiaminase activity in freshwater and marine fishes. Oral Presentation at the Joint Aquatic Sciences Meeting, Grand Rapids, MI

***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., Richard, J., Reed, A., Pinger, C., Richter, C., Edwards, T., Kraus, J., Suffridge, C., Mantua, N., and Johnson, R., 2025, Investigating how multiple stressors drive thiamine deficiency linked to declines of Pacific salmonid populations: in: DoD Energy and Environment Innovation Symposium, Washington, DC, December 2-5, 2025.

VanArnam, B., P. Harte, **F.E. Rowland,** C. Davis, H.L. Ballard, R. Meyer, J. Eppele, C. Jeffres, R.C. Johnson, M. Webb, S. Garrett, and G. Treaster. May 2025. Measuring impacts of youth-participatory science: Collaborations in Diverse Educational Settings. Conference for Advancing Participatory Sciences, Portland, OR.

Rowland, F.E., A.N. Reed, J.A. Krajcik, D.E. Tillitt. Nov 2023. Thiamine (vitamin B1) supplementation improves survival and body condition of hatchery-reared steelhead (Onchorhynchus mykiss) in Oregon). Poster Presentation at the Society of Environmental Toxicology and Chemistry Annual Meeting. Louisville, KY.

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 = $3,115,515)

2025-2029 Strategic Environmental Research and Development Program (SERDP) Grant, *Investigating how multiple stressors drive thiamine deficiency linked to declines of Pacific salmonid populations*, **Lead PI F. Rowland**, co-PIs J. Kraus, C. Richter, T. Edwards, A. Reed, C. Pinger, C. Suffridge, J. Rinchard, N. Mantua, R. Johnson. FY25-FY29 ($1,997,000)

2025-2028 Great Lakes Fisheries Trust Grant, *Evaluation of thiamine deficiency in lake whitefish as a potential cause of their recruitment failure*. Lead PI: Jacques Rinchard, SUNY Brockport; Co-PIs Sarah Beech, Ontario Ministry of Natural Resources and Forestry Jose Bonilla Gomez, US Fish and Wildlife Service Chris Davis, Ontario Ministry of Natural Resources and Forestry; Kris Dey, Little Traverse Bay Bands of Odawa Indians; Erin Dunlop, Ontario Ministry of Natural Resources and Forestry; Aaron Fisk, University of Windsor; Scott Hansen, Wisconsin DNR; Ian Harding, Treaty Natural Resources Division; Tim Johnson, Ontario Ministry of Natural Resources and Forestry; Ryan Lauzon, Chippewas of Nawash Unceded First Nation; Steve Lenart, Michigan DNR; Ellen Marsden, Rubenstein Ecosystem Science Laboratory, University of Vermont; Gary Michaud, Little Traverse Bay Bands of Odawa Indians; Erik Olsen, Grant Traverse Band-Natural Resources Department; Paul Ripple, Bay Mills Indian Community; **Freya Rowland**, **USGS Columbia Environmental Research Center;** Joseph Schmitt, USGS Great Lakes Science Center – Lake Erie Biological Station; Jason Smith, Bay Mills Indian Community, Biological Services; Jack Tuomikoski, Sault Ste. Marie Tribe of Chippewa Indians; Tina VanDoornik, Little River Band of Ottawa Indians. FY25-FY28 ($362,647)

2024-2026 Great Lakes Fish and Wildlife Restoration Act Grant, *Prey fish quality drives Thiamine Deficiency Complex in lake trout (Salvelinus namaycush)*. SUNY Brockport: J. Rinchard, J. Ludwig, M. Futia, USGS: **F. Rowland**, C. Stricker, MI DNR: S. Sitar, NY USGS B. O'Malley, USGS Lake Superior Biological Station: D. Yule, USGS Lake Superior Biological Station. FY24-FY26 ($200,000)

2025-2026 John Wesley Powell Center for Analysis and Synthesis, *Identifying root causes of thiamine deficiency complex in global aquatic ecosystems*, **Lead PI F. Rowland**, co-

	PIs C. Suffridge and J. Rinchard ($120,000). Co-funded by NSF OPUS program and NCEAS!
2025-2026	Collaboration with lead PI: Chad Teal, Utah State University: *Thiamine Availability in the Weber River and its Implications for Native Fish Conservation and Sportfish Management* Co-PIs: A. Reed, **F. Rowland**, D. Walters ($130,968).
2024-2026	Science Support Program, US Fish and Wildlife Service Pacific Northwest, *To B1 or Not to B1: Responding to an Ecosystem-Level Thiamin Deficiency Impacting Pacific Salmon*, **Lead PIs F. Rowland** (USGS) and A. Goodwin (USFWS) FY25-FY26 ($116,000)
2022-2024	Natural Resource Damage Assessment and Restoration Program ($60,000) project to develop Bayesian networks for injury determination. Lead PIs **F. Rowland**, C. Kotalik, B. Marcot, co-PI David Walters.
2021-2023	Bureau of Reclamation, *Thiamine deficiency evaluation in life stages of Shortnose and Lost River suckers*, Lead PI **F. Rowland** and co-PI D. Walters. ($29,900)
2021-2023	Yale Natural Lands Grant, *Competition and predation as major drivers of rapid evolution in the wood frog (Rana sylvatica)*. Lead PIs Y. Alshwairikh and **F. Rowland** ($10,000)
2019-2021	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)
2016-2017	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 -2016	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)

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:

Introduction to R Shiny, Physalia Courses, January 2024. Instructor: *Dr. Mohamed EL Fodil Ihaddaden*

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.

PROFESSIONAL MEMBERSHIPS

- American Fisheries Society (2022–*present*)
- International Association of Great Lakes Research (2019–2021, 2023–*present*)
- Association for the Sciences of Limnology and Oceanography (2020–*present*)
- Ecological Society of America (2007–2010, 2015–*present*)
- Herpetologists' League (2013–2019)
- 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, 2021–*present*)

SERVICE AND LEADERSHIP

Service

- CERC Diversity, Equity, Inclusion, and Accessibility Council Member (2023–*present*)
- Associate Editor, Journal of Herpetology (2019–2022)
- 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
Journal of Herpetology
Hydrobiologia
Diversity
Herpetological Conservation and Biology
Ecological Research
Journal of Animal Ecology
Limnology and Oceanography
Water Research
Limnology & Oceanography Letters
Basic and Applied Ecology
Oecologia
Wetlands
Journal of Great Lakes Research
Biological Control
Water
Food Webs
Environmental Science & Technology
Freshwater Science
Environmental Toxicology and Chemistry
Journal of Zoology
ACS Measurement Science

Leadership

- CERC Writing Group, Founder (2021–*present*)
- Greeley Lab Agraphia Group, Founder (2019–2022)
- 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

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