

Stephen M. Powers, Ph.D.

Curriculum Vitae

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Stephen M. Powers on [Google Scholar](#) and [ResearchGate](#)

EDUCATION

- Ph.D. Limnology and Marine Sciences, University of Wisconsin Madison, College of Engineering, 2012. Advised by Dr. Emily H. Stanley.
- M.S. Limnology and Marine Sciences, University of Wisconsin Madison, College of Engineering, 2008. Advised by Dr. Emily H. Stanley.
- B.S. Biological Sciences and B.S. Environmental Studies, University of California Santa Barbara, College of Letters and Science, 2003. Senior thesis advised by Dr. John M. Melack and Dr. Robert C. Wilkinson.

APPOINTMENTS

Current

- Research Associate, Center for Environmental Research Education & Outreach (CEREO) & School of the Environment, Washington State University, 2017-present

Prior

- Postdoctoral Researcher, Center for Environmental Research Education & Outreach (CEREO) & School of the Environment, Washington State University, 2015-2017
- Instructor of Record, Environmental Science 592-07: Systematic Reviews in Environmental Science. Washington State University, Spring 2017
- Postdoctoral Researcher, Environmental Change Initiative, University of Notre Dame, 2012 to 2015
- Research Assistant, North Temperate Lakes Long-term Ecological Research (NTL-LTER) project, University of Wisconsin Madison, 2009-2012
- Research Assistant, Center for Limnology, River Ecology Lab, University of Wisconsin Madison, 2005-2008
- Teaching Assistant, Zoology Dept., University of Wisconsin Madison, 2005, 2007, 2010
- Research Technician, Center for Ecosystem Management and Restoration (CEMAR), Oakland CA, 2004-2005
- Research Technician, Fish Conservation and Culture Lab (Byron, CA), University of California Davis, 2004

PUBLISHED ARTICLES

18. **Powers SM**, Baulch HM, Hampton SE, Labou SG, Lottig NR, and Stanley EH. 2017. Nitrification contributes to winter oxygen depletion in seasonally frozen forested lakes. [*Biogeochemistry* 136: 119-129](#). doi.org/10.1007/s10533-017-0382-1

17. **Powers SM**, Labou SG, Baulch HM, Hunt RJ, Lottig NR, Hampton SE, and Stanley EH. 2017. Ice duration drives winter nitrate accumulation in north temperate lakes. [*Limnology and Oceanography Letters* 2: 177–186](#). doi:10.1002/lol2.10048
16. Hampton SE, Galloway AWE, **Powers SM**, Ozersky T, Woo KH, Batt RD, Labou SG, O'Reilly CM, Sharma S, Lottig NR, Stanley EH, North RL, Stockwell JD, Adrian R, Weyhenmeyer GA, Arvola L, Baulch HM, Bertani I, Bowman LL, Jr., Carey CC, Catalan J, Colom-Montero W, Domine LM, Felip M, Granados I, Gries C, Grossart HP, Haberman J, Haldna M, Hayden B, Higgins SN, Jolley JC, Kahilainen KK, Kaup E, Kehoe MJ, MacIntyre S, Mackay AW, Mariash HL, McKay RM, Nixdorf B, Nöges P, Nöges T, Palmer M, Pierson DC, Post DM, Pruett MJ, Rautio M, Read JS, Roberts SL, Rucker J, Sadro S, Silow EA, Smith DE, Sterner RW, Swann GEA, Timofeyev MA, Toro M, Twiss MR, Vogt RJ, Watson SB, Whiteford EJ, and Xenopoulos MA. 2017. Ecology under lake ice. [*Ecology Letters* 20: 98-111](#).
15. MacDonald GA, Jarvie HP, Withers P, Doody D, Keeler B, Haygarth PM, Miyittah M, **Powers SM**, Sharpley AN, Shen J, Smith D, Weintraub M, and Zhang T. 2016. Guiding phosphorus stewardship for multiple ecosystem services. [*Ecosystem Health and Sustainability* 2](#).
14. **Powers SM** and Hampton SE. 2016. Winter limnology as a new frontier. [*Limnology and Oceanography Bulletin* 25: 103-108](#). (article not peer-reviewed).
13. Deemer BR, Harrison JA, Li S, Beaulieu JJ, DelSontro T, Barros N, Neto JFB, **Powers SM**, dos Santos MA, and Vonk JA. 2016. Greenhouse gas emissions from reservoir water surfaces: a new global synthesis. [*Bioscience* 66: 949-964](#).
12. **Powers SM**, Bruulsema TW, Burt TP, Chan NI, Elser JJ, Haygarth PM, Howden NJK, Jarvie HP, Lu Y, Peterson HM, Sharpley AN, Shen J, Worrall F, and Zhang F. 2016. Long-term accumulation and transport of anthropogenic phosphorus in three river basins. [*Nature Geoscience* 9: 353-356](#). [Link to feature in Environmental Science and Policy](#).
11. **Powers SM**, Tank JL, and Robertson DM. 2015. Control of nitrogen and phosphorus transport by reservoirs in agricultural landscapes. [*Biogeochemistry* 124: 417-439](#).
10. Kornis MS, Weidel BC, **Powers SM**, Diebel MW, Cline TJ, Fox JM, and Kitchell JF. 2015. Fish community dynamics following dam removal in a fragmented agricultural stream. [*Aquatic Sciences* 77 \(3\): 465-480](#).
9. Haygarth PM, Jarvie HP, **Powers SM**, Sharpley AN, Elser JJ, Shen J, Peterson HM, Chan NI, Howden NJK, Burt TP, Worrall F, Zhang F, and Liu X. 2014. Sustainable phosphorus management and the need for a long-term perspective: the legacy hypothesis. [*Environmental Science & Technology \(viewpoint\)* 48 \(15\): 8417-8419](#).
8. **Powers SM**, Robertson DM, and Stanley EH. 2014. Effects of lakes and reservoirs on annual river nitrogen, phosphorus, and sediment export in agricultural and forested landscapes. [*Hydrological Processes* 28 \(24\): 5919-5937](#).
7. **Powers SM**, Julian JP, Doyle MW, and Stanley EH. 2013. Retention and transport of nutrients in a mature agricultural impoundment. [*Journal of Geophysical Research-*](#)

[*Biogeosciences* 118: 1-13. Featured in Research Spotlight of Eos, Transactions of the American Geophysical Union Vol 94 Issue 10.](#)

6. **Powers SM**, Johnson RA, and Stanley EH. 2012. Nutrient retention and the problem of hydrologic disconnection in streams and wetlands. [*Ecosystems* 15 \(3\), 435-449.](#)
5. Stanley EH, **Powers SM**, Lottig NR, Buffam I, and Crawford JT. 2012. Contemporary changes in dissolved organic carbon of human-dominated rivers: Is there a role for DOC management? [*Freshwater Biology* 57 \(Suppl 1\), 26-42.](#)
4. Julian JP, Seegart SZ, **Powers SM**, Stanley EH, and Doyle MW. 2011. Light as a first-order control on ecosystem structure in a temperate stream. [*Ecohydrology* 4: 422-432.](#)
3. Stanley EH, **Powers SM**, and Lottig NR. 2010. The evolving legacy of disturbance in stream ecology: concepts, contributions, and coming challenges. [*Journal of the North American Benthological Society* 29 \(1\): 67-83.](#)
2. **Powers SM**, Stanley EH, and Lottig NR. 2009. Quantifying phosphorus uptake using pulse and steady-state approaches in streams. [*Limnology and Oceanography-Methods* 7: 498-508.](#)
1. Julian JP, Doyle MW, **Powers SM**, Stanley EH, and Riggsbee JA. 2008. Optical water quality in rivers. [*Water Resources Research* 44: 1-19.](#)

DATA PRODUCTS (SELECTED)

- **Powers SM** and Labou SG. 2016. Long-term winter chemical limnology and days since ice-on for primary study lakes 1983-2014. <https://lter.limnology.wisc.edu/content/north-temperate-lakes-lter-long-term-winter-chemical-limnology-and-days-ice-primary-study>
- Hampton SE, Labou SG, Woo KH, Galloway AWE...**Powers SM** et al. 2016. Winter and summer comparison of biological, chemical, and physical conditions in seasonally ice-covered lakes. KNB Data Repository. doi:10.5063 <https://knb.ecoinformatics.org/#view/doi:10.5063/F12V2D1V>
- Deemer BR, Harrison JA, Li S, Beaulieu JJ, DelSontro T, Barros N, Bezerra-Neto JF, **Powers SM**, dos Santos MA, and Vonk JA. 2016. Data from: Greenhouse gas emissions from reservoir water surfaces: a new global synthesis. Dryad Digital Repository. <http://dx.doi.org/10.5061/dryad.d2kv0>

HONORS AND PROFESSIONAL ACTIVITIES

- Gene E. Likens Award Winner for outstanding publication by an early career scientist, Ecological Society of America, Biogeosciences Section, Fall 2017.
- Software Carpentry Workshop Assistant, Washington State University, Fall 2017.
- R Working Group steering committee, Center for Environmental Research, Education, & Outreach, 2017-present. R Working Group steering committee, Center for Environmental Research, Education, & Outreach, 2017-present.

- Video abstract. Haygarth PM, **Powers SM**, Scholz M, and Shen J. Legacy Phosphorus in Three River Basins, Sustainable Phosphorus Alliance, <https://m.youtube.com/watch?v=ebAwMmLTaFk>
- Guest interview on radio show “The Perpetual Notion Machine,” WORT- Madison, WI. Dec 1, 2016. Link to broadcast: <http://www.wortfm.org/ecology-under-lake-ice/>
- Judge, Showcase for Undergraduate Research and Student Activities (SURCA). Washington State University. Spring 2016.
- Workshop co-organizer, *Human Dimensions of the Phosphorus Cycle*, Socio-Environmental Synthesis Center (SESYNC), Feb 21-24 2016, with co-organizer Gen Metson.
- Session co-convener at American Geophysical Union fall meeting, Human Alteration of the Phosphorus Cycle: Past, Present, & Future. San Francisco CA, 2015.
- COMPASS Science Communication Workshop participant, Washington State University, Fall 2015. Co-organized by Nancy Baron, Stephanie Hampton, Ken Weiss, and others.
- Chair of subcommittee, Phosphorus Sustainability Research Coordination Network (NSF-funded RCN, PI James J. Elser), 2015-present.
- Stakeholder meeting of the Phosphorus Sustainability Research Coordination Network (NSF-funded RCN, PI James J. Elser), Washington DC, May 2015.
- Early Career Travel Award, Association for the Sciences of Limnology and Oceanography (ASLO), 2014 and 2016.
- Invited participant at Lake Erie research planning workshop. Phosphorus along the land-river-lake continuum: a research planning workshop focused on Lake Erie. Supported by National Center for Water Quality Research, Heidelberg University, Tiffin OH. March 2014.
- Meeting of the Phosphorus Sustainability Research Coordination Network (NSF-funded RCN, PI James J. Elser), Tempe AZ, Jan 2014.
- Co-chair of subcommittee on phosphorus storage, transport, and impacts. Phosphorus Sustainability Research Coordination Network (NSF-funded RCN), 2013-2015.
- Session co-convener at American Geophysical Union fall meeting, Linking Landscape and Watershed Processes with Aquatic Ecosystem Functions, Service, and Sustainability, San Francisco CA, 2013.
- Invited participant at inaugural Summer Institute for early career scientists, National Center for Ecological Analysis and Synthesis (NCEAS), Santa Barbara CA, 2013 (supported by Packard Foundation). ***One of 22 selected out of >400 applicants.***
- Kenneth Malueg Award for Graduate Student Excellence, 2010 (UW Madison Center for Limnology).
- President, Limnology and Fisheries Society (LAFS), UW Madison, 2009-2010.
- Limnology Seminar Chair, UW Madison, 2009-2010.

- Consultant, Center for Ecosystem Management and Restoration (CEMAR), Oakland CA, 2006.
- Limited-term Technician, Inter-fluve Inc., Madison WI, 2005-2006.
- Distinction in the Major, Environmental Studies Program (UCSB), 2003. Senior thesis title: *Summer extremes in water temperature and dissolved oxygen in relation to the requirements of Steelhead Trout around Santa Barbara, CA*. Advised by Dr. John Melack and Dr. Robert Wilkinson.
- Honors at Graduation, College of Letters and Science (UCSB), 2003.
- 3-week Colorado Summer Course on Western Water, credit from California State University, San Francisco State. Instructed by Dr. Jack Holmes. 2002.

Service to National Science Foundation and other funders

- Proposal reviewer (ad-hoc) for NSF, Geography and Spatial Sciences Program.
- Proposal reviewer (ad-hoc) for NSF, Division of Environmental Biology, Ecosystem Studies Program.
- Proposal reviewer for Minnesota Water Resources Center.

Recognition for peer review activity

- Excellence in Reviewing Award for 2016, for the journal *Biogeochemistry* (awarded to 25 top reviewers of 2016).
- Outstanding reviewer for 2015, for the journal *Biogeochemistry*.

Invited peer reviewer for 25+ scientific journals:

1- *Ambio*. 2- *Biogeochemistry*. 3- *Canadian Journal of Fisheries and Aquatic Sciences* (CJFAS). 4- *Journal of Environmental Quality* (JEQ, Crop Science Society of America). 5- *Ecological Applications* (Ecological Society of America). 6- *Environmental Science and Pollution Research*. 7- *Environmental Science & Technology* (ES&T, American Chemical Society). 8- *Freshwater Science*. 9- *Geoderma*. 10- *Geophysical Research Letters* (GRL, American Geophysical Union). 11- *Global Biogeochemical Cycles* (GBC, American Geophysical Union). 12- *Journal of Geophysical Research- Biogeosciences* (JGRB, American Geophysical Union). 13- *Global Change Biology* (GCB). 14- *Journal of Hydrology* (JOH). 15- *Journal of Soils and Sediments* (JSS). 16- *Hydrobiologia*. 17- *Hydrology and Earth System Sciences Discussions* (HESSD). 18- *International Journal of Geo-Information* (International Society for Photogrammetry and Remote Sensing). 19- *International Review of Hydrobiology*. 20- *Lake and Reservoir Management* (North American Lake and Reservoir Management Society). 21- *Limnology and Oceanography* (Association for the Sciences of Limnology and Oceanography). 22- *Limnology and Oceanography: Fluids & Environments* (L&O:F&E, Association for the Sciences of Limnology and Oceanography). 23- *Limnology and Oceanography: Methods* (LOM, Association for the Sciences of Limnology and Oceanography). 24- *Public Library of Sciences I* (PLOS ONE). 25- *Science of the Total Environment* (STOTEN). 26- *Water*. 27- *Water Research*. 28- *Water Resources Research* (WRR, American Geophysical Union).

SUCCESSFUL GRANT PROPOSALS

- **Powers SM.** Alaska Airlines Travel Award, Food-Energy-Water Nexus division. Supported Fall 2016.
- **Powers SM** and Metson G. Award from the Socio-Environmental Synthesis Center (SESYNC). Project title: *Human dimensions of the global phosphorus (P) cycle: food and waste transport through cities and infrastructure*. Supported Fall 2015. Interdisciplinary workshop w/ assembled team, Annapolis, MD, Feb 22-25.
- **Powers SM** and Tank JL. Award from the Illinois Nutrient Research & Education Council (NREC), submitted via Livingston County Soil and Water Conservation District (SWCD). 2015. Project title: *Linking voluntary conservation effort to water quality improvement in a watershed with majority enrollment* (Indian Creek, IL).
- John Jefferson Davis Memorial Award, UW Madison Zoology Department, 2009 & 2011. Graduate Investigator: **Powers SM**. Faculty Mentor: Emily H. Stanley.
- Anna Grant Birge Memorial Award, UW Madison Limnology and Marine Sciences, 2006 & 2008. Graduate Investigator: **Powers SM**. Faculty Mentor: Emily H. Stanley.
- Undergraduate Research Award, Undergraduate Research and Creative Activities (UCSB), 2003.

TEACHING EXPERIENCE

- Instructor of record, Systematic Reviews in Environmental Science (EnvSci 592-7), WSU (Spring 2017).
- Teaching Assistant, UW Madison, Ecology of Streams (Zoology 548; lead TA, Spring 2010).
- Guest Lecturer, UW Madison, Limnology Lecture (Zoology 316; Fall 2008). Topic: Reservoir Limnology.
- Teaching Assistant, UW Madison, Limnology Laboratory (Zoology 316; lead TA, Fall 2007).
- Teaching Assistant, UW Madison, Limnology Laboratory (Zoology 316; Fall 2005).

PRESENTATIONS

Invited Presentations

- **Powers SM.** From nitrate accumulation under lake ice to phosphorus accumulation in catchments: insights from long-term research. Washington State University, Center for Environmental Research Education & Outreach (CEREO) Seminar, Fall 2017.
- **Powers SM.** Highlights from sustainable Phosphorus (P) research: international comparisons and legacy P. Sustainable Phosphorus Research Coordination Network Meeting. Washington DC. Spring 2017.

- **Powers SM.** Boyer T, Macintosh K. Managing phosphorus at the source vs. the sink: implications for agriculture, cities, and freshwater. Sustainable Phosphorus Webinar Series, hosted by Sustainable Phosphorus Alliance. Spring 2017.
- **Powers SM.** Water, elemental cycles, and people: nitrogen and phosphorus flows in aquatic ecosystems and landscapes. Palouse ecology, evolution, and systematics (PEES). Washington State University. Spring 2016.
- **Powers SM.** A brief interactive introduction to the R package *Shiny*. Washington State University, PACCAR Environmental Technology R group. Spring 2016.
- **Powers SM.** Long-term accumulation and transport of anthropogenic phosphorus in world river basins. Washington State University, Center for Environmental Research Education & Outreach (CEREO) Seminar, Fall 2015.
- **Powers SM.** Coupled hydrological-biogeochemical cycles and management across the land-water interface in agricultural river basins. University of Toledo, Department of Environmental Science. Spring 2015.
- **Powers SM,** Tank JL, and Robertson DM. A historical perspective on reservoir nitrogen and phosphorus accumulation, mobilization, and management. Special session on reservoir management, Joint Aquatic Sciences Meeting (JASM). Portland, OR. Spring 2014.
- **Powers SM.** Nutrient processing and transport through an aquatic landscape. University of Notre Dame, Environmental Change Initiative. Spring 2012.

Contributed Presentations

21. Mayer B, Baker L, Boyer T, Macintosh K, McDowell R, McGrath J, Mihelcic J, **Powers S,** Rittman B, Vaneekhaute C. Phosphorus Research Coordination Network: Future Technologies Working Group Summary. Sustainable Phosphorus Forum. Washington DC. Spring 2017.
20. Weintraub M, MacDonald G, Johnson L, Haygarth P, Bruulsema T, Zhang T, Shen J, Withers P, Smith D, Sharpley A, Macintosh M, Doody D, Jarvie H, Koutika L, Kraemer S, Miyittah M, McDowell R, **Powers SM.** Phosphorus Research Coordination Network: Multiple Benefits Working Group Summary. Sustainable Phosphorus Forum. Washington DC. Spring 2017.
19. **Powers SM,** Beusen AH, Bouwman AF, Chowdhury RB, Macdonald GK, Macintosh KA, McCrackin M, Metson G, Vaccari DA, Hampton SE. 2017. Global co-distribution of human population density & agricultural lands: Where are the hot spots for phosphorus recycling potential? 2017. Aquatic Sciences meeting Association for the Sciences of Limnology and Oceanography (ASLO), Honolulu, HI.
18. Hampton S, **Powers SM,** Galloway AW, Labou SG, Ozersky T, Stanley EH, Woo KH. 2017. Global synthesis of winter plankton and nutrient data from seasonally ice covered lakes. Aquatic Sciences meeting Association for the Sciences of Limnology and Oceanography (ASLO), Honolulu, HI.

17. **Powers SM**, Labou SG, Stanley EH, and Hampton SE. Dissolved nitrogen and phosphorus dynamics under lake ice revealed from long-term measurements. 2016. Summer meeting of the Association for the Sciences of Limnology and Oceanography (ASLO), Santa Fe, NM.
16. **Powers SM**. Long-term accumulation and transport of anthropogenic phosphorus in world river basins. 2015. Poster, fall meeting of the American Geophysical Union (AGU). San Francisco, CA.
15. Global greenhouse gas emissions from reservoirs: a matter of methane. Deemer BR, Harrison JA, Beaulieu J, Li S, dos Santos MA, Neto JFB, **Powers SM**, Vonk JA, del Sontro T, Barros N. Spring 2015. Association for the Sciences of Limnology and Oceanography, Aquatic Science Meeting. Granada, Spain.
14. **Powers SM**, Burt TP, Chan NI, Elser JJ, Haygarth PM, Howden N, Jarvie HP, Peterson HM, Shen J, Worrall F, Sharpley AN. 2014. Legacy phosphorus accumulation and management in the global context: insights from long-term analysis of major river basins. Fall meeting of the American Geophysical Union (AGU). San Francisco, CA.
13. Stanley EH, Lottig NR. **Powers SM**, and Crawford JT. 2014. Integrating lakes into stream biogeochemistry: When do lakes matter? Joint Aquatic Sciences Meeting (JASM). Portland, OR. Spring 2014.
12. Dee MM, Tank JL, Mahl UH, and **Powers SM**. Estimating the impact of floodplain restoration on nutrient export from the Wabash River watershed: a historical perspective. Joint Aquatic Sciences Meeting (JASM). Portland, OR. Spring 2014.
11. **Powers SM**, Tank JL, Robertson DM. 2013. Retention of nitrogen and phosphorus by reservoirs and lakes of the Upper Mississippi, Ohio, and Great Lakes Basins. Poster, fall meeting of the American Geophysical Union. San Francisco, CA.
10. **Powers SM**, Tank JL, Robertson DM. 2013. Landscape differences in the temporal variability of stream nitrogen and phosphorus input to the Great Lakes. Presentation, Annual conference of the International Association for Great Lakes Research (IAGLR). Purdue University, IN.
9. **Powers SM**, Robertson DM, and Stanley EH. 2013. Landscape effects of agricultural and aquatic systems on interannual variability of river phosphorus, nitrogen, and sediment export. Presentation, American Water Resources Association Spring Specialty Conference: Agricultural hydrology and water quality. St. Louis, MO.
8. **Powers SM**, Robertson DM, Stanley EH, and Tank JL. 2012. Contrasting nitrogen and phosphorus export regimes of Midwest streams. Poster, fall meeting of the American Geophysical Union. San Francisco, CA.
7. **Powers SM**, and Stanley EH. 2011. Water chemistry responses to hydraulic manipulation of an agricultural wetland. Poster, fall meeting of the American Geophysical Union. San Francisco, CA.

6. **Powers SM**, and Stanley EH. 2011. Water chemistry responses to hydraulic manipulation of a flow-through wetland. Presentation, annual meeting of the Ecological Society of America. Austin, TX.
5. **Powers SM**, and Stanley EH. 2010. Stream and wetland nitrate uptake across extremes in channel form. Presentation, Joint meeting of Association for the Sciences of Limnology and Oceanography and North American Benthological Society. Santa Fe, NM.
4. Johnson RA, **Powers SM**, and Stanley EH. 2010. Spatial and temporal contrasts in nitrate uptake for a wetland stream. Poster, Joint meeting of Association for the Sciences of Limnology and Oceanography and North American Benthological Society. Santa Fe, NM.
3. **Powers SM** and Stanley EH. 2009. Aquatic controls of inter-annual variability in river phosphorus yields. Presentation, annual meeting of the North American Benthological Society. Grand Rapids, MI.
2. **Powers SM**, Stanley EH, and Lottig NR. 2008. Interpreting nutrient uptake metrics in streams using dynamic transport modeling. Presentation, annual meeting of the Ecological Society of America. Milwaukee, WI.
1. **Powers SM** and Stanley EH. 2007. Transport and retention of phosphorus pulses in highly developed ecosystems. Presentation, annual meeting of the North American Benthological Society. Columbia, SC.

TOOLS, TECHNIQUES, MODELING, AND DATA SYNTHESIS

Selected experience

-Scripted analysis using *R* (10+ years experience), autoregressive time series analysis, linear mixed effects modeling, *GitHub* collaboration, cluster analysis and regression trees, longitudinal transport and reaction kinetics modeling (*OTIS*- one dimensional transport with inflow and storage), river load estimation modeling, *SQL* and relational databases, spatial analysis in *QGIS*.

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Geophysical Union (AGU)
- Association for the Sciences of Limnology and Oceanography (ASLO)
- American Water Resources Association (AWRA)
- Ecological Society of America (ESA)
- Global Lakes Ecological Observatory Network (GLEON)
- International Association for Great Lakes Research (IAGLR)
- Society for Freshwater Science (SFS)