

STUART ALLEN LUDSIN

PERSONAL INFORMATION

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Aquatic Ecology Laboratory
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EDUCATION

- Ph.D. The Ohio State University, Evolution, Ecology and Organismal Biology (EEOB), Columbus, 2000
M.S. Auburn University, Fisheries and Allied Aquacultures, Auburn, AL, 1994
B.S. Miami University, Zoology, Oxford, OH, 1992

RESEARCH/WORK EXPERIENCE

- Professor, EEOB, OSU, Columbus, 2019-present.
Associate Professor, EEOB, OSU, Columbus, 2013-2019.
Assistant Professor, EEOB, OSU, Columbus, 2007-2013.
Research Fishery Biologist, Department of Commerce, National Oceanic and Atmospheric Administration, Great Lakes Environmental Research Laboratory, Ann Arbor, MI, 2002-2007.
Post-doctoral Fellow, Great Lakes Institute for Environmental Research (GLIER), Department of Biological Sciences, University of Windsor, Windsor, ON, Canada, 2001-2002.
Graduate Research Associate, OSU, EEOB, Columbus, 1995-2000.
Graduate Research Associate, Auburn University, Fisheries and Allied Aquacultures, Auburn, AL, 1992-1994.
Undergraduate Research Assistant, OSU, Zoology, Columbus, May-July 1991.

UNIVERSITY APPOINTMENTS

- Professor. OSU, Environmental Sciences Graduate Program, Columbus, 2019-present.
Associate Professor. OSU, Environmental Sciences Graduate Program, Columbus, 2013-2019.
Assistant Professor. OSU, Environmental Sciences Graduate Program, Columbus, 2009-2013.
Adjunct Associate Professor. University of Michigan, School of Natural Resources and the Environment, Ann Arbor, 2007-present.
Adjunct Assistant Professor. University of Toledo, Biology, Toledo, OH, 2006-present.
Adjunct Assistant Professor. University of Windsor, Biological Sciences, Windsor, ON, 2003-present.
Adjunct Faculty Member. Bowling Green State University, Biological Sciences, Bowling Green, OH, 2003-present.

SELECTED RESEARCH GRANTS (TOTAL AWARD AMOUNT: > \$21,000,000; N = 32 TOTAL)

Ongoing

1. **Ohio Lake Erie Commission, Lake Erie Protection Fund**. "HAB & hypoxia impacts on Lake Erie food webs and fisheries." PI, 2019-2020, \$49,924.
2. **Great Lakes Fishery Commission, Fisheries Research Program**. "Moving Toward ecosystem-based fisheries management: developing an integrated ecosystem assessment of Lake Erie as a case study". Co-PI, 2019-2020, \$136,582.

3. **NOAA, Ohio Sea Grant College Program.** “Stock structure and contribution of west and east basin walleye to recreational and commercial fisheries in Lake Erie”. PI, 2018-2020, \$119,724.
4. **Ohio Department of Higher Education.** “Physiological, growth and survival response of age-0 yellow perch and walleye to toxic cyanobacteria”. PI, 2018-2020, \$152,886.
5. **National Science Foundation,** Division of Integrative Organismal Systems. “The influence of the prey physiological stress response on predator-prey interactions”. Co-PI, 2016-2020, \$652,556
6. **Great Lakes Fishery Commission,** Fisheries Research Program. “Habitat quality as a driver of Lake Erie walleye population dynamics: past, present & future”. PI, 2016-2020, \$284,691.
7. **Great Lakes Fishery Commission,** Fisheries Research Program. “Do discrete spawning stocks contribute differentially to Lake Erie’s walleye fisheries?”. Co-PI, 2016-2020, \$273,000.
8. **Great Lakes Fishery Commission,** Fisheries Research Program. “Physical processes and fish recruitment in large lakes: Phase II.”. PI, 2016-2020, \$220,000.
9. **Ohio Department of Natural Resources-Division of Wildlife,** Federal Aid in Sport Fish Restoration Project. “Fish Management in Ohio”. PI, 2010-2020, \$15,000,000 (\$1,500,000 annually).

Completed

1. **Ohio Department of Higher Education.** “Development of the MMPB method for quantifying total microcystins in edible fish tissues”. PI, 2016-2018, \$156,617.
2. **Ohio Department of Higher Education.** “Fish flesh and fresh produce as sources on microcystin exposure to humans”. PI, 2015-2017, \$162,598.
3. **United States Department of Agriculture, Natural Resources Conservation Service.** “Integrating the cropland and wildlife components of the conservation effects assessment project (CEAP) to assess and forecast benefits of agricultural BMPs to biological endpoints across the western Lake Erie basin watershed”. Co-PI, 2013-2016, \$271,416.
4. **NOAA, Ohio Sea Grant College Program.** “Impacts of climate change on public health in the Great Lakes through harmful algal blooms”. Co-PI, 2012-2016, \$189,506.
5. **National Science Foundation,** Coupled Natural and Human Systems Program. “Co-evolution of upstream human behavior and downstream ecosystem services in a changing climate”. Co-PI, 2011-2017, \$1,499,995.
6. **Great Lakes Fishery Commission,** Fisheries Research Program. “A coupled physical-biological model to forecast larval yellow perch distributions, growth rates, and potential recruitment in Lake Erie”. Co-PI, 2011-2014, \$199,699.
7. **Great Lakes Fishery Commission,** Fisheries Research Program. “Winter warming effects on yellow perch reproduction and recruitment”. PI, 2010-2013, \$112,725.
8. **Great Lakes Fishery Commission,** Fisheries Research Program. “River discharge as a predictor of Lake Erie yellow perch recruitment”. PI, 2006-2011, \$347,583.
9. **NOAA, ECOFORE Program.** “ECOFORE 2006: Forecasting the causes, consequences, and potential solutions for hypoxia in Lake Erie”. Co-PI, 2006-2014, \$2,200,000
10. **NOAA, CSCOR Program.** “NGOMEX 2006: Spatially-explicit, high-resolution mapping and modeling to quantify hypoxia effects on the living resources of the Northern Gulf of Mexico”. Co-PI (Project leader), 2006-2009, \$1,462,729

SELECTED REFEREED PUBLICATIONS (OUT OF N = 87 IN PRESS OR PUBLISHED)

1. Chen, K.Y., E.A. Marschall, M.G. Sovic, A.C. Fries, H.L. Gibbs, and **S.A. Ludsin.** 2018. assignPOP: An R package for population assignment using genetic, non-genetic, or integrated data in a machine-learning framework. *Methods in Ecology and Evolution* 9:439-446.

2. Manubolu, M., J. Lee, K.M. Riedl, Z.X. Kua, L.P. Collart, and **S.A. Ludsin**. 2018. Optimization of extraction methods for quantification of microcystin-LR and microcystin-RR in fish, vegetable, and soil matrices using UPLC-MS/MS. *Harmful Algae* 76:47-57.
3. Collingsworth, P.D., D.B. Bunnell, M.W. Murray, Y.C. Kao, Z.S. Feiner, R.M. Claramunt, B.M. Lofgren, T.O. Höök, and **S.A. Ludsin**. 2017. Climate change as a long-term stressor for the fisheries of the Laurentian Great Lakes of North America. *Reviews in Fish Biology and Fisheries*. 27:363-391.
4. Keitzer, S.C., **S.A. Ludsin**, S.P. Sowa, G. Annis, J.G. Arnold, P. Daggupati, A.M. Froehlich, M.E. Herbert, M.V. Johnson, A.M. Sasson, H. Yen, M.J. White, and C.A. Rewa. 2016. Thinking outside of the lake: Can controls on nutrient inputs into Lake Erie benefit stream conservation in its watershed? *Journal of Great Lakes Research* 42:1322-1331
5. Brodnik, R.L., M.E. Fraker, E.J. Anderson, L. Carreon-Martinez, K.M. DeVanna, D.D. Heath, J.M. Reichert, E.F. Roseman, and **S.A. Ludsin**. 2016. Larval dispersal underlies demographically important intersystem connectivity in a Great Lakes yellow perch (*Perca flavescens*) population. *Canadian Journal of Fisheries and Aquatic Sciences* 73:416-426.
6. DeVanna-Fussell, K.M., R.E.H. Smith, M.E. Fraker, L. Boegman, K.T. Frank, T.J. Miller, J.T. Tyson, K.K. Arend, D. Boisclair, S.J. Guildford, R.E. Hecky, T.O. Höök, O.P. Jensen, J.K. Llopiz, C.J. May, R.G. Najjar, L.G. Rudstam, C.T. Taggart, Y.R. Rao, and **S.A. Ludsin**. 2016. A perspective on needed research, modeling, and management approaches that can enhance Great Lakes fisheries management under changing ecosystem conditions. *Journal of Great Lakes Research* 42:743-752.
7. Farmer, T.M, E.A. Marschall, K. Dabrowski, and **S.A. Ludsin**. 2015. Short, warm winters threaten fish populations. *Nature Communications* 6:7724. doi:10.1038/ncomms8724.
8. Fraker, M.E., E.J. Anderson, R. Brodnik, L. Carreon-Martinez, K.M. DeVanna, B.J. Fryer, D.D. Heath, J.M. Reichert, and **S.A. Ludsin**. 2015. Particle backtracking improves breeding subpopulation discrimination and natal-source identification in mixed populations. *Plos One* 10(3): e0120752.
9. Bunnell, D.B., R.P. Barbiero, **S.A. Ludsin**, C.P. Madenjian, G. Warren, D. Dolan, T. Brenden, R. Briland, O.T. Gorman, J.X. He, T.H. Johengen, B.F. Lantry, T.F. Nalepa, S.C. Riley, C.M. Riseng, T.J. Treska, I. Tsehaye, D.M. Warner, M.G. Walsh, and B.C. Weidel. 2014. Changing ecosystem dynamics in the Laurentian Great Lakes: bottom-up and top-down regulation. *BioScience* 64:26-39. Cover photo of *BioScience* Issue.
10. Carreon-Martinez, L.B., K.W. Wellband, T.B. Johnson, **S.A. Ludsin**, and D.D. Heath. 2014. Novel molecular approach demonstrates turbid river plumes reduce predation mortality on larval fish. *Molecular Ecology* 23:5366–5377.
11. Gebremariam, S., J.F. Martin, C. DeMarchi, N.S. Bosch, R. Confesor., and **S.A. Ludsin**. 2014. A comprehensive approach to evaluating watershed models for predicting river flow regimes critical to downstream ecosystem services. *Environmental Modelling & Software* 61:121-134.
12. **Ludsin, S.A.**, K.M. DeVanna, and R.E.H. Smith. 2014. Physical-biological coupling and the challenge of understanding fish recruitment in large lakes. *Canadian Journal of Fisheries and Aquatic Sciences* 71:775-794.
13. Scavia, D., J.D. Allan, K.K. Arend, S. Bartell, D. Beletsky, N.S. Bosch, S.B. Brandt, R.D. Briland, I. Daloğlu, J.V. DePinto, D.M. Dolan, M.A. Evans, T.M. Farmer, D. Goto, H. Han, T.O. Höök, R. Knight, **S.A. Ludsin**, D. Mason, A.M. Michalak, R.P. Richards, J.J. Roberts, D.K. Rucinski, E. Rutherford, D.J. Schwab, T. Sesterhenn, H. Zhang, and Y. Zhou. 2014. Assessing and addressing the re-eutrophication of Lake Erie: central basin hypoxia. *Journal of Great Lakes Research* 40: 226–246.
14. Zhang, H., D.M. Mason, C.A. Stow, A.T. Adamack, S.B. Brandt, X. Zhang, D.G. Kimmel, M.R. Roman, and W.C. Boicourt, and **S.A. Ludsin**. 2014. Hypoxia, habitat quality, and the spatial distribution of pelagic fishes in the northern Gulf of Mexico. *Marine Ecology Progress Series* 505:209-226.
15. Pangle, K.L, T.D. Malinich, D.R. DeVries, D.B. Bunnell, and **S.A. Ludsin**. 2012. Context-dependent planktivory: interacting effects of turbidity and predation risk on adaptive foraging. *Ecosphere* 3: article 114 (18 pp). <http://dx.doi.org/10.1890/ES12-00224.1>.

16. Arend, K.K., D. Beletsky, J.V. DePinto, **S.A. Ludsin**, J.J. Roberts, D.K. Rucinski, D. Scavia, D.J. Schwab, and T.O. Höök. 2011. Seasonal and interannual effects of hypoxia on fish habitat quality in central Lake Erie. *Freshwater Biology* 56:366-383.
17. Pangle, K.L., **S.A. Ludsin**, and B.J. Fryer. 2010. Otolith microchemistry as a stock identification tool for freshwater fishes: testing its limits in Lake Erie. *Canadian Journal of Fisheries and Aquatic Sciences* 67:1475–1489.
18. Reichert, J.M., B.J. Fryer, K.L. Pangle, T.B. Johnson, J.T. Tyson, A.B. Drelich, and **S.A. Ludsin**. 2010. River-plume use during the pelagic larval stage benefits recruitment of a lentic fish. *Canadian Journal of Fisheries and Aquatic Sciences* 67:987-1004.
19. **Ludsin, S.A.**, X. Zhang, S.B. Brandt, M.R. Roman, W.C. Boicourt, D.M. Mason, and M. Costantini. 2009. Hypoxia-avoidance by planktivorous fish in Chesapeake Bay: Implications for food web interactions and fish recruitment. *Journal of Experimental Marine Biology and Ecology* 381(Suppl. 1):S121-S131.
20. Costantini, M., **S.A. Ludsin**, D.M. Mason, X. Zhang, W.C. Boicourt, and S.B. Brandt. 2008. Effect of hypoxia on habitat quality of striped bass (*Morone saxatilis*) in Chesapeake Bay. *Canadian Journal of Fisheries and Aquatic Sciences* 65:989-1002.
21. **Ludsin, S.A.**, B.J. Fryer, and J.E. Gagnon. 2006. Comparison of solution-based versus laser-ablation ICPMS for analysis of larval fish otoliths. *Transactions of the American Fisheries Society* 135:218–231.
22. Mora, C., P.M. Chittaro, P.F. Sale, J.P. Kritzer, and **S.A. Ludsin**. 2003. Patterns and processes in reef fish diversity. *Nature* 421:933-936.
23. **Ludsin, S.A.**, and A.D. Wolfe. 2001. Biological invasion theory: Darwin’s contributions from The Origin of Species. *BioScience* 51:780-789.
24. **Ludsin, S.A.**, M.W. Kershner, K.A. Blocksom, R.L. Knight, and R.A. Stein. 2001. Life after death in Lake Erie: nutrient controls drive fish species richness, rehabilitation. *Ecological Applications* 11:731-746.
25. **Ludsin, S.A.**, and D.R. DeVries. 1997. First-year recruitment of largemouth bass: the interdependency of early life stages. *Ecological Applications* 7:1024-1038.

RECENT AWARDS AND HONORS RECEIVED

Best student presentation. Indiana and Ohio Chapters of the American Fisheries Society, Muncie, IN, 2017.

- Dillon, R., J.D. Conroy, and **S.A. Ludsin**. 2017. Determining potential bias by *Chaoborus* during hydroacoustic surveys of prey fish biomass in Ohio reservoirs.

Chandler-Misener Award, International Association of Great Lakes Research, 2015.

- Most notable paper in the *Journal of Great Lakes Research* during 2014.

Invited speaker. Growth–Survival Paradigm in Early Life Stages of Fish: Controversy, Synthesis, and Multidisciplinary Approach Symposium. Yokohama, Japan, 2015.

Keynote Speaker. 38th Annual Larval Fish Conference, American Fisheries Society, Québec City, Canada, 2014.

Most outstanding poster. Natural and Mathematical Sciences Undergraduate Research Forum, Organismal Biology Division, OSU.

- Corey, M.M., K.Y. Chen, E.A. Marschall, J.W. Olesik, and **S.A. Ludsin**. Otolith microchemistry as a tool to discriminate between river-spawning populations of walleye in Lake Erie.

Best student presentation. American Fisheries Society – Ohio Chapter, Columbus, 2014.

- Farmer, T.M., E.A. Marschall, K. Dabrowski, and **S.A. Ludsin**. Climate change effects on Lake Erie yellow perch reproduction and recruitment.

Most outstanding poster. Natural and Mathematical Sciences Undergraduate Research Forum, Organismal Biology Division, OSU, 2012.

- Lang, K.J., K.L. Pangle, J.D. Conroy, S. Goonewardena, and **S.A. Ludsin**. Hypoxia as a mediator of food web interactions and energy flow in reservoir ecosystems.

Best Professional Presentation. American Fisheries Society – Ohio Chapter, Ashland, 2012.

- Filbrun, J.E., D.A. Culver, and **S.A. Ludsin**. Does artificial feed enhance age-0 channel catfish growth?

Best Professional Paper. American Fisheries Society – Indiana Chapter, Indianapolis, 2009.

- Arend, K., T. Höök, **S. Ludsin**, D. Rucinski, J. DePinto, and D. Scavia. 2009. Evaluating and forecasting effects of hypoxia on yellow perch habitat suitability in central Lake Erie.

Best Student Paper. American Fisheries Society-Michigan Chapter, Monroe, 2009.

- Roberts, J.J., T.O. Höök, **S.A. Ludsin**, S.A. Pothoven, and H.A. Vanderploeg. Implications of hypoxia for yellow perch habitat quality in Lake Erie’s central basin: a spatially-explicit bioenergetics modeling approach.

Faculty Recognition Award for Outstanding Research Mentorship, Undergraduate Research Opportunities Program (UROP), University of Michigan, 2007.

Director’s Award for Outstanding Effort. NOAA-GLERL, 2006.

Employee of the Year. NOAA-GLERL, 2005.

SELECTED PROFESSIONAL SERVICE & SYNERGISTIC ACTIVITIES

Associate Editor

- *Journal of Great Lakes Research*, 2015-present.
- *Transactions of the American Fisheries Society*, 2005-2008.

Expert Participant, Ohio Fish Consumption Advisory Committee annual meeting, Columbus, OH, 2019.

Panelist, NOAA CoastWatch Users Engagement Session, Ann Arbor, MI, 2019.

Plenary Session Co-organizer. Midwest Fish and Wildlife Conference, Cleveland, OH, 2018-2019.

Workshop Developer. Demystifying Proposal Writing. Early Career Event, Larval Fish Conference, Victoria, BC, 2018.

Proposal Peer Review Panel, Great Lakes Fishery Trust, 2017-2018.

External Evaluator, Czech Academy of Sciences, Biological Sciences Division, 2015.

Management Council, Cooperative Institute for Limnology and Ecosystem Research, University of Michigan, Ann Arbor, 2015-2016.

Co-organizer/Steering Committee Co-Chair, “Modeling tools for analysis and forecasting of fish recruitment and its response to physical processes” Workshop, Huron, OH, 2014.

Co-organizer/Steering Committee Co-Chair, “Physical-biological coupling as a driver of fish recruitment under changing ecosystem states”, Huron, OH, 2013.

TAcLE (Taking Action on Lake Erie) Work Group, International Joint Commission Science Advisory Board, 2012-2013.

Co-organizer/Steering Committee Co-Chair, “Physical-biological coupling and fish recruitment in large lakes: state of knowledge and opportunities for progress”, Romulus, MI, 2011.

Climate Change Outreach Team, Ohio Sea Grant College Program, 2011-present.

Cooperative Institute for Limnology and Ecosystems Research (CILER) Council of Fellows, member, University of Michigan, 2011-present.

Advisory Committee Member, Ohio Sea Grant College Program, 2010-present.

Advisory Committee Member, Stone Laboratory, 2010-present.

Advisory Committee Member, Center for Lake Erie Area Research (CLEAR), 2010-present.

Advisory Committee Member, Great Lakes Aquatic Ecosystem Research Consortium (GLAERC), 2010-present.

Technical Advisory Committee, Healing Our Waters – Great Lakes Coalition, 2009-present

Co-coordinator and moderator, OSU-Ohio DNR-Division of Wildlife Lake Erie-Inland Waters Annual Research Review Meeting, Columbus, OH, 2009-2015.

Board of Technical Experts (BOTE), Great Lakes Fishery Commission, 2007-present.

Associate Editor, *Transactions of the American Fisheries Society*, 2005-2008.

Panel Member, Climate Change in the Great Lakes Region Conference, Michigan State University, East Lansing, MI, 2008

Workshop Steering Committee Member, "Ecological Impacts of Hypoxia", Bay St. Louis, MS, 2007.

Co-organizer, Lake Erie Science Planning Workshop, NOAA-GLERL, 2004.

ACADEMIC MENTORING

Post-doctoral Researcher Supervisor (4 current, 10 past)

M.S. and Ph.D. Graduate Student Advisor (6 current, 11 past)

Undergraduate Student Researcher Advisor (1 current, 21 past)

SELECTED PROFESSIONAL ORGANIZATION MEMBERSHIP

American Fisheries Society

- **Science Planning Committee Member**, North Central Division Representative, 2019-present
- **Sally Leonard Richardson Best Student Paper Award Evaluations Panel**, member, 2017
- **Evaluator** of student posters/papers, 2000 and 2002
- **President**, Auburn University Chapter of AFS, Auburn, AL, 1993-1994
- **Treasurer**, Auburn University Chapter of AFS, 1992-1993

Ecological Society of America (ESA)

- **Appointed ESA Scientific Planning Committee Representative**, EcoSummit 2012 International Conference, 2011-2012

International Association for Great Lakes Research

- **Board of Directors**, elected U.S. representative, 2012-2015
- **Nominations Committee Chair**, 2012-2015
- **Expert Panel Member**, 2008-present
- **Publications Committee member**, 2014-present
- **Paul W. Rodger's Scholarship Evaluations Panel**, member, 2015
- **IAGLR Scholarship Evaluations Panel**, member, 2014
- **Norman S. Baldwin Scholarship Evaluations Panel**, member, 2002, 2008, and 2013
- **Evaluator** of student papers, 2014

SELECTED PUBLIC OUTREACH ACTIVITIES

Public Lecturer.

- Expedition Club. Columbus, OH, 2019. Title: The threat that human-driven changes to Lake Erie pose to its fisheries.
- Old North High Club. Columbus, OH, 2018. Title: Climate change: a primer.
- Rotary Club. Columbus, OH, 2018. Title: Climate change: a primer.
- Trout Unlimited. Wooster, OH, 2018. Title: The threat that human-driven changes to Lake Erie pose to its fisheries.
- Lakeside Chautauqua Environmental Stewardship Educational Seminar Series, Lakeside, OH, 2013. Title: Climate change impacts on fishes of the Great Lakes.

Co-organizer of Museum of Biological Diversity Open House, Columbus, OH, 2017-2018.

- Helped organize multiple interactive exhibits on aquatic food webs (~1,200 visitors)

Co-coordinator of high school student research internships, Columbus, OH.

- St. Charles Preparatory School, Columbus, OH, summer 2014-2018 (2-3 students per year)

Co-coordinator of student visits, Aquatic Ecology Laboratory, OSU, Columbus, OH.

- Indianola K-8 (~30 students), Columbus, OH 2016
- Columbus Academy High School (~15 students), Columbus, OH 2016
- OSU Mathematical Biosciences Institute Undergraduate Program (22 students), Columbus, 2010
- Women in Science Day (~60 students), 1997, 2010

K-12 Education Panel Member, Worthington, OH, 2017.

- Elevate: A Worthington Community Conversation on Creativity, Innovation, and Education

Guest Lecturer/Presenter

- 6th Grade Science Class, Worthington Estates Elementary School, 2017
- Buckeye Friends of Stone Lab, Columbus, OH, 2016
- OSU, EEOB 8896, 2014
- OSU, MBI Summer Undergraduate Program, Columbus, 2014-2015
- Purdue University, Forestry and Natural Resources, West Lafayette, IN, 2011
- University of Windsor, Biological Sciences, Windsor, ON, Canada, 2001

Public Lecturer, Lakeside Chautauqua Environmental Stewardship Educational Seminar Series, Lakeside, OH, 2013.

- Climate change impacts on fishes of the Great Lakes

Science fair judge

- Worthington Estates Elementary School, 2017
- Worthington Kilbourne High School, 2015, 2017