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Aquatic Ecologist
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EDUCATION

Ph.D. The Ohio State University, Columbus, OH 2006.

M.S. Aquatic Ecology, Ocean University of China, Qingdao, Shandong Province, 1997.

B.S. Marine Aquaculture, Ocean University of China, Qingdao, Shandong Province, 1994.

PROFESSIONAL EXPERIENCE

2019-present: Aquatic Ecologist, Eureka Aquatic Research, LLC. Ann Arbor

2011-2019: Assistant Research Scientist, Cooperative Institute for Limnology and Ecosystems Research (CILER, now CIGLR), School of Natural Resources and Environment (SNRE, now SEAS), University of Michigan, Ann Arbor.

2007-2011: Research Investigator, CILER, SNRE, University of Michigan, Ann Arbor.

1999-2006: Graduate Research Associate, The Ohio State University, Columbus.

1999-2006: Graduate Teaching Associate, EEOB, OSU, Columbus.

1997-1999: Research Fellow, Institute of Oceanology, Chinese Academy of Sciences, Qingdao, Shandong Province.

1994-1997: Graduate Research Associate, Ocean University of China

PUBLICATIONS

1. Alsip, P.J., Zhang, H., Rowe, M.D., Rutherford, E.S., Mason, D.M., Riseng, C.M., and Su, Z. 2020. Modeling the interactive effects of nutrient loads, meteorology, and invasive mussels on suitable habitat for Bighead and Silver Carp in Lake Michigan. *Biological Invasions*. <https://doi.org/10.1007/s10530-020-02296-4>
2. Rutherford, E.S., Zhang, H., Kao, Y-C, Mason, D.M., Shakoor, A., Bouma-Gregson, K., Breck, J., Lodge, D, Chadderton, W.L. Potential effects of bigheaded carps on four Laurentian Great Lakes food webs. *North American Journal Fisheries Management*. *In press*.
3. Robinson, K.F., Alsip, P., Drake, D. A, Kao, Y-C, Koops, M.A., Mason, D.M., Rutherford, E.S., Zhang, H. Reviewing uncertainty in bioenergetics and food web models to project invasion consequences: four major Chinese carps in the Great Lakes. *Journal of Great Lakes Research*. *In press*.
4. Ivan, L.N., Mason, D.M., Zhang, H., Rutherford, E.S., Hunter, T., Sable, S., Adamack, A.T., and Rose, K. 2020. Potential establishment and ecological effects of Bighead and Silver Carp in a productive embayment of the Laurentian Great Lakes. *Biological*

Invasions. **22**, pages2473–2495. <https://link.springer.com/article/10.1007%2Fs10530-020-02263-z>.

5. Alsip, P.J., Zhang, H. Rowe, M.D., Mason, D.M., Rutherford, E.S., Riseng, C.M., and Su, Z. 2019. Lake Michigan's suitability for bigheaded carp: The importance of diet flexibility and subsurface habitat. *Freshwater Biology*. <https://doi.org/10.1111/fwb.13382>
6. **Zhang H.**, Rutherford E.S., Mason D.M., et al. 2019. Modeling potential impacts of three benthic invasive species on the Lake Erie food web. *Biological Invasions*, 21: 1697-1719. <https://link.springer.com/article/10.1007/s10530-019-01929-7>.
7. **Zhang, H.**, Boegman, L., Scavia, D., Culver, D.A., 2016. Spatial distributions of external and internal phosphorus loads in Lake Erie and their impacts on phytoplankton and water quality. *Journal of Great Lakes Research*, 42:1212-1227.
8. Lodge, D.M., Simonin, P.W., Burgiel, S.W., Keller, R.P., Bossenbroek, J.M., Jerde, C.L., Kramer, A.M., Rutherford, E.S., Barnes, M.A., Wittmann, M.E., Chadderton, W.L., Apriesnig, J.L., Beletsky, D., Cooke, R.M., Drake, J.M., Egan, S.P., Finnoff, D.C., Gantz, C.A., Grey, E.K., Hoff, M.H., Howeth, J.G., Jensen, R.A., Larson, E.R., Mandrak, N.E., Mason, D.M., Martinez, F.A., Newcomb, T.J., Rothlisberger, J.D., Tucker, A.J., Warziniack, T.W., **Zhang, H.** 2016. Risk Analysis and Bioeconomics of Invasive Species to Inform Policy and Management. *Annual Review of Environment and Resources*, 41:453-488.
9. **Zhang, H.**, Rutherford, E. S., Mason, D. M., Breck, J. T., Wittmann, M. E., Cooke, R. M., Lodge, D. M., Rothlisberger, J. D., Zhu, X., Johnson, T. B. 2016. Forecasting the impacts of Silver and Bighead Carp on the Lake Erie food web. *Transaction of American Fisheries Society*, 145:136-162.
10. Wedchaparn, O., Zhao, L., Fan, Y., He, D., **Zhang, H.**, Ivan, L.N., Liu, Q., Ayisi, C.L. 2016. Comparison of the trophic niches between two planktivorous fishes in two large lakes using stable isotope analysis. *Biochemical Systematics and Ecology*, 68: 148-155.
11. Cooke, R.M., Wittmann, M.E., Lodge, D.M., Rothlisberger, J.D., Rutherford, E.S., **Zhang, H.**, Mason, D.M. 2014. Out-of-sample validation for structured expert judgment of Asian carp establishment in Lake Erie. *Integrated Environmental Assessment and Management*, 10: 522-528.
12. Wittmann, M.E., Cooke, R.M., Rothlisberger, J.D., Rutherford, E.S., **Zhang, H.**, Mason, D.M., Lodge, D.M. 2014. Use of structured expert judgment to forecast invasions by Bighead and Silver Carp in Lake Erie. *Conservation Biology*, 29:187-197.
13. **Zhang, H.**, Mason, D.M., Stow, C., Adamack, A.T., Brandt, S.B., Zhang, X., Kimmel, D. G., Roman, M.R., Boicourt, W.C., and Ludsin, S.A. 2014. Effects of hypoxia on habitat quality of pelagic planktivorous fishes in the Northern Gulf of Mexico. *Marine Ecology Progress Series*, 505: 209-226.
14. Scavia, D., Allan, J.D., Arend, K.K., Bartell, S., Beletsky, D., Bosch, N.S., Brandt, S.B., Briland, R.D., Daloglu, I., DePinto, J.V., Dolan, D.M., Evans, M.A., Farner, T.M., Goto, D., Han, H., Hook, T.O., Knight, R., Ludsin, S.A., Mason, D.M., Michalak, A.M.,

- Richards, R.P., Roberts, J.J., Rucinski, D.K., Rutherford, E.S., Schwab, D.J., Sesterhenn, T., **Zhang, H.**, and Zhou, Y. 2014. Assessing and addressing the re-eutrophication of Lake Erie: Central basin hypoxia. *Journal of Great Lakes Research*, 40:226-246.
15. Langseth, B.J., Rogers, M., and **Zhang, H.** 2012. Modeling species invasions in Ecopath with Ecosim: An evaluation using Laurentian Great Lakes models. *Ecological Modelling*, 247: 251-261.
 16. Brandt, S.B., Costantini, M., Kolesar, S., Ludsin, S.A., Mason, D.M., Rea, C.M., and **Zhang, H.** 2011. Does hypoxia improve habitat quality for Lake Erie walleye? A bioenergetics perspective. *Canadian Journal of Fisheries and Aquatic Sciences*, 68: 857-879.
 17. **Zhang, H.**, Culver, D.A., and Boegman, L. 2011. Dreissenids in Lake Erie: an algal filter or a fertilizer? *Aquatic Invasion*, 6: 175-194.
 18. Conroy, J.D., Boegman, L., **Zhang, H.**, Edwards, W.J., Culver, D.A. 2011. “Dead Zone” dynamics in Lake Erie: The importance of weather and sampling intensity for calculated hypolimnetic oxygen depletion rates. *Aquatic Sciences*, 73: 289-304.
 19. Xia, M., Craig, P.M., Schaeffer, B., Stoddard, A., ASCE, A.M., Liu, Z., Peng, M., **Zhang, H.**, Wallen, C.M., Bailey, N., Mandrup-Poulsen, J. 2010. The influence of physical forcing on bottom-water dissolved oxygen within the Caloosahatchee River Estuary, FL. *Journal of Environmental Engineering – ASCE*, 136: 1032-1044.
 20. **Zhang, H.**, Ludsin, S.A., Mason, D.M., Adamack, A.T., Brandt, S.B., Zhang, X., Kimmel, D.G., Roman, M.R., Boicourt, W.C. 2009. Hypoxia-driven changes in the behavior and spatial distribution of pelagic fish and mesozooplankton in the Northern Gulf of Mexico. *Journal of Experimental Marine Biology and Ecology*, 381: 80-91.
 21. Culver, D.A., Conroy, J.D., Tyson, J.T., Crane, V.C., and **Zhang, H.** 2009. “Optimal” P loading in large lakes affects fish communities: Do you prefer walleye or yellow perch? *Verhandlungen des Internationalen Verein Limnologie*, 30: 1070-1072.
 22. **Zhang, H.**, Culver, D.A., and Boegman, L. 2008. A two-dimensional ecological model of Lake Erie: Application to estimate dreissenid impacts on large lake plankton populations. *Ecological Modelling*, 214: 219-241.
 23. Zhang, G., Li, C., Sun, S., **Zhang, H.**, Sun, J., and Ning, X. 2006. Feeding habits of *Calanus sinicus* (Crustacea: Copepoda) during spring and autumn in the Bohai Sea studied with the herbivore index. *Scientia Marina*, 70: 381-388.
 24. Conroy, J.D., Edwards, W.J., Pontius R.A., Kane D.D., **Zhang, H.**, Shea J.F., Richey J.N., and Culver, D.A. 2005. Soluble nitrogen and phosphorus excretion of exotic freshwater mussels (*Dreissena* spp.): Potential impacts for nutrient remineralization in western Lake Erie. *Freshwater Biology*, 50: 1146-1162.
 25. Wang, R., **Zhang, H.**, Wang, K., and Zuo, T. 2002. Distribution and population dynamics of *Paracalanus parvus*, *Paracalanus crassirostris*, and *Acartia bifilosa* (Copepoda, Calanoida) in the Bohai Sea. *Chinese Journal of Oceanology and Limnology*. 20: 348-357.

OTHER PUBLICATIONS

3. Great Lakes Water Quality Agreement Nutrient Annex Draft Ensemble Modeling Report. Modeling Subgroup, Ann Arbor, MI. March 2015. <http://graham.umich.edu/scavia/wp-content/uploads/2009/11/Annex-4-draft-report-06-24-15.pdf>
2. Currie, W.J.S., Cuddington, K.M.D., Stewart, T.J., **Zhang, H.** and Koops, M.A. 2012. Modelling spread, establishment and impact of Bighead and Silver Carps in the Great Lakes. DFO Canadian Science Advisory Secretariat Research Document 2011/113. vi + 74 p. http://www.dfo-mpo.gc.ca/Csas-sccs/publications/resdocs-docrech/2011/2011_113-eng.pdf
1. Stewart, T.J., **Zhang, H.**, and Currie, W.J.S. 2012. Preliminary assessment of the trophic consequences of Asian Carp establishment in offshore Lake Ontario. DFO Canadian Science Advisory Secretariat Research Document 2011/113. Page 58-73.

RESEARCH PROJECTS

- 2018-2021. Implications of phosphorus reduction for sustainable Great Lakes Fisheries. Great Lakes Fishery Commission. PI Marten Kooks at Fisheries and Oceans Canada,
- 2017-2020. Food web modeling to support risk assessment of Asian carp in the Great Lakes. US EPA GLRI Asian Carp Regional Coordinating Committee.
- 2016-2019. LEOFS-Hypoxia operational Lake Erie hypoxia forecasting for public water systems decision support. NOAA Coastal Hypoxia Research Program (CHRP).
- 2016-2018. Empowering communities with online action planning tools: Tipping points and indicators for improving water quality across the Great Lakes. US EPA Great Lakes Restoration Initiative.
2016. Impacts of Asian carp on Great Lakes food webs and R2X transition to USACE. NOAA Great Lakes Environmental Research Laboratory.
- 2015-2018. Forecasting biological and economic impacts of aquatic invasive species in Lake Michigan. Great Lakes Fishery Trust.
- 2014-2016. Decision support of western Lake Erie phosphorus concentration to mitigate harmful and nuisance algal blooms. US EPA Great Lakes Restoration Initiative.
- 2014-2015. HABS, bacteria, and beach quality forecasting for the Great Lakes Ocean and Human Health Center. US EPA Great Lakes Restoration Initiative.
- 2014-2015. Phosphorus load response modeling for Lake Erie. EPA GLINPO Task Order. Awarded to Battelle. Subcontract to University of Michigan.
- 2013-2014. U.S. – China Planning Visits: Catalyzing Collaboration on Forecasting the Potential Impacts of Invasive Species. National Science Foundation.
- 2009-2014. Forecasting spread and bioeconomic impacts of aquatic invasive species from multiple pathways to improve management and policy in the Great Lakes, co-funded by National Oceanic and Atmospheric Association and the US EPA Great Lakes Restoration Initiative.

STUDENT MENTORING

1. Tony Harris, undergraduate student (Sophomore) from Loyola University Chicago, Doris Duke Conservation Scholar, June-July, 2017.
2. Rachel Fadlovich, undergraduate student (Junior) from Arizona State University, UM CIGLR Great Lakes Summer Fellow, 2017.
3. Chelsea Weiskerger. 1st year PhD student from Michigan State University, UM CIGLR Great Lakes Summer Fellow, 2017.
4. Nicholas Boucher, UM SEAS Thesis Master's Student 2016-2018 Peter Alsip, UM SEAS Thesis Master's Student 2016-2018.
5. Wanqi Ouyang, UM SNRE Master's Project, February 2016-May 2017.
6. Emily Murphy, undergraduate student (Sophomore) from Wesleyan University, Doris Duke Conservation Scholar, June-July, 2016.
7. Ryan Anderson, undergraduate student (Sophomore) from Brown University, Doris Duke Conservation Scholar, June-July, 2016.
8. Raquel Goosey, undergraduate student (Senior) from UM LSA Mathematics, hourly student, May, 2016 –May 2017
9. Cody Yarbrough, Master's student from UM Environmental Engineering, UM CIGLR Great Lakes Summer Fellow, 2016.
10. Maria Hernandez, undergraduate student (Senior) from Brown University, UM CIGLR Great Lakes Summer Fellow, 2016.
11. Lillian McGill, undergraduate student (Senior) from University of Notre Dame, UM CIGLR Great Lakes Summer Fellow, 2015.
12. Kyle Dettloff, Master's student from Oregon State University, UM CIGLR Great Lakes Summer Fellow, 2015.
13. Sherika Gibson, undergraduate student at UM-Dearborn, UM CIGLR Great Lakes Summer Fellow Jun-Nov, 2014.
14. Wan-Ning Chen, SNRE graduate student, independent study. 2013-2014.
15. Xin Xu, hourly MS graduate from UM SNRE. Jul-Oct. 2014
16. Kiefer Forsch, undergraduate from Oberlin College, OH, UN CIGLR Great Lakes Summer Fellow Jun-Aug 2013.
17. Linsay Cain, Master's graduate student, 2012. SNRE, University of Michigan. Committee member.
18. Li, Miling, UM SNRE Master's graduate student, UM CIGLR Great Lakes Summer Fellow, 2011.
19. Keith Hayse-Gregson, UM SNRE Master's graduate student, UM CIGLR Great Lakes Summer Fellow, 2011.