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Education

Ph.D., Marine Environmental Estuarine Sciences	University of Maryland	1992
M.S., Marine Science	University of Miami	1982
B.S., Biology	Tufts University	1976

Experience

Research Fishery Biologist NOAA Great Lakes Environmental Research Laboratory (October 2008 – present); Interim Director (June 2007 – September 2008) University of Michigan Cooperative Institute for Limnology and Ecosystems Research; Associate Research Scientist, University of Michigan, Ann Arbor, MI. (2003-2008); Assistant Research Scientist, University of Michigan (1994-2003); Postdoctoral Fellow, Oak Ridge Associated Universities, at Cornell University, Ithaca, NY. (1992-1994); Graduate Fellow, Electric Power Research Institute, University of Maryland, Solomons, MD. (1991-1992); Graduate Research Assistant, University of Maryland, Solomons, MD. (1987-1991); Fisheries Technician, Everglades National Park, Homestead, FL. (1979-1987).

Professional and Scientific Organizations

Member American Fisheries Society, International Association for Great Lakes Research

Publications

Feiner, Z. S., Wang, H-Y, Hook, T. O., **Rutherford, E. S.**, Vandergoot, C., Rudstam, L. G., Zorn, T. G., Fielder, D. **In Press.** Adaptation and environmental variation influence egg size and maternal effects in a freshwater fish. *Ecosphere*.

Kao, Y-C, S. A. Adlerstein, and **E. S. Rutherford.** **In Press.** Top Down and Bottom Up Controls on the Collapse of Alewives (*Alosa pseudoharengus*) in Lake Huron. *Ecosystems*.

Rutherford, E. S., J. Allison, C. R. Ruetz III, J. Elliott, J. Nohner, M. DuFour, R. O’Neal, D. J. Jude, and S. R. Hensler. **In Press.** Density and Survival of Walleye Eggs and Larvae in the Muskegon River, Michigan. *Transactions of the American Fisheries Society*.

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- D. Goto, H. Han, T. O. Höök, R. Knight, S. A. Ludsin, D. M. Mason, A. M. Michalak, R. P. Richards, J. J. Roberts, D. K. Rucinski, **E. S. Rutherford**, D. J. Schwab, T. M. Sesterhenn, H. Zhang, and Y. Zhou. **2014**. Addressing and readdressing the re-eutrophication of Lake Erie: Central basin hypoxia. *J. Great Lakes Research* 40:226-246.
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- Höök, T.O., **E.S. Rutherford**, S.J. Brines, D.M. Mason, D.J. Schwab, and M.J. McCormick, G.W. Fleischer, T.J. DeSorcie, T.J., and W.G. Sprules, W.G. **2003**. Spatially explicit measures of production of young alewives in Lake Michigan: Linkage between essential fish habitat and recruitment. *Estuaries* 26(1):21-29.
- Höök, T.O., **E.S. Rutherford**, S.J. Brines, C.A. Geddes, D.M. Mason, D.J. Schwab, and G.W. Fleischer. **2003**. Landscape scale measures of steelhead (*Oncorhynchus mykiss*) bioenergetic growth rate potential in Lake Michigan and comparison with catch rates. *Journal of Great Lakes Research*. 30:545-556.
- Madenjian, C. P., G.L. Fahnenstiel, T.H. Johengen, T.F. Nalepa, H.A. Vanderploeg, G.W. Fleischer, P.J. Schneeberger, D.M. Benjamin, E.B. Smith, J.R. Bence, E.S. **Rutherford**, D.M. Lavis, D.M. Robertson, D.J. Jude, and M.P. Ebener. **2002**. Dynamics of the Lake Michigan food web, 1970-2000. *Canadian Journal of Fisheries and Aquatic Sciences* 59:736-753.
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Manuscripts in Review:

- Adlerstein, S. A., Y-C Kao, **E. S. Rutherford**, J. Kelly, and G. Keoleian. **In review**. Potential Food Web Impacts of Offshore Wind farm Siting in Saginaw Bay, Lake Huron. *Environmental Science and Technology*.
- Beletsky, D., R. Beletsky, **E. S. Rutherford**, J. Sieracki, J. Bossenbroek, W. L. Chadderton, M. E. Wittmann, and D. M. Lodge. **In review**. Spread of aquatic invasive species by lake currents. *Journal of Great Lakes Res.*
- Kramer, A. M., G. Annis, M. E. Wittmann, W. L. Chadderton, **E. S. Rutherford**, D. M. Lodge, L. A. Mason, and J. M. Drake. **In Review**. Suitability of Great Lakes for aquatic invasive species based on global species distribution models and local aquatic habitat. *Ecological Applications*.
- Mason, L. A., C. M. Riseng, A. D. Gronewold, **E. S. Rutherford**, J. Wang, A. Clites, S. D.P. Smith, P. B. McIntyre. **In Review**. Fine-scale spatial variation in ice cover and surface temperature trends across the surface of the Laurentian Great Lakes. *Climate Change*.
- Simpson, N., A. Honsey, **E. S. Rutherford**, and T. O. Höök. **In Review**. Spatial shifts in salmonine harvest, catch rate and effort by charter boat anglers in Lake Michigan, 1992-2012. *J. Great Lakes Res.*

Wittmann, M. E., G. Annis, A. M. Kramer, L. A. Mason, C. M. Riseng, **E. S. Rutherford**, W. L. Chadderton, D. Beletsky, J. M. Drake, D. M. Lodge. **In review**. Refining species distribution model outputs using landscape scale habitat data: Forecasting Grass Carp and Hydrilla verticillata establishment in the Great Lakes Region. *J. Great Lakes Res.*

Manuscripts in Preparation

Rutherford, E. S., H. A. Vanderploeg, J. Cavaletto, J. Liebig, S. Pothoven, D. M. Mason, A. Hoover, J. Elliott, D. Burnette, K. Mabrey, P. Bourdeau, S. Peacor, R. Claramunt, D. Bunnell, T. O'Brien and D. Warner. In Prep. Have Changes in Lake Michigan's Lower Food Web Affected Fish Larvae Growth, Density and Potential Recruitment? *Journal of Great Lakes Research.*

Rutherford, E. S., H. Zhang, A. Shakoor, K. Hayes Gregson, J. T. Breck, D. M. Mason and H. A. Vanderploeg. In prep. Did Dreissena Mussels beat Asian Carp to the Buffet Table?: Modeling potential impacts of future invasive species on the Lake Michigan food web. *Journal of Great Lakes Research.*

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David, S. R., and **E. S. Rutherford**. The influence of physical habitat factors on a near-shore fish community in the lower Muskegon River, Michigan. *Freshwater Ecology.*

Zhang, H., **E. S. Rutherford**, D. M. Mason, and A. Adamack. Simulating food web response to hypoxia in Lake Erie. *Ecosystems.*

Rutherford, E.S., J.A. Tyler, M.J. Wiley, D. Hyndman, B. Pijanowski, and L.N. Ivan. Modeling impacts of climate change and land use change on fisheries in a Great Lakes tributary. *Canadian Journal of Fisheries and Aquatic Sciences.*

Breck, J.E., C.P. Simon, **E.S. Rutherford**, P.J. Lamberson, B.S. Low and D.R. Swank. When to Mature? Answers from life history theory. *Proc. Royal Acad. Sci. B.*

Rutherford, E.S., D.M. Mason, D. Zafft, and R.F. Elliott. Factors influencing spatial and temporal variability in recruitment of Chinook salmon to Lake Michigan. *Transactions of the American Fisheries Society.*

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- Brenton, B.D., **E.S. Rutherford**, K.A. Rose, and C.R. Bronte. Simulating effects of ruffe invasion on walleye and yellow perch populations in the Great Lakes. *Canadian Journal of Fisheries and Aquatic Sciences*.
- Giuliano, A. M., **E. S. Rutherford**, M. Luttenton, N. A. Godby, Jr., C. M. Riseng and M. J. Wiley. Effects of zebra mussel invasion on macroinvertebrate density, and juvenile steelhead distribution, diet, growth, and condition in the Muskegon River, Michigan. *J. Great Lakes Res.*
- Marko, K. M., E. S. Rutherford, B. J. Eadie, and M. B. Lansing. Stable Isotope analysis of food webs in the Muskegon River Estuary. *J. Great Lakes Res.*
- Woldt, A.P. and **E.S. Rutherford**. Production of young steelhead in two central Lake Michigan tributaries. *Journal of Great Lakes Res.*
- Swank, D.R., and **E.S. Rutherford**. Spatial variation in life history traits of wild Great Lakes steelhead populations. *Canadian Journal of Fisheries and Aquatic Sciences*.
- Swank, D.R., and **E.S. Rutherford**. Temporal variation in life history traits of wild Great Lakes steelhead populations. *Canadian Journal of Fisheries and Aquatic Sciences*.
- Joseph, C.G., **E.S. Rutherford**, T.O. Höök, L. Mason, and C.P. Madenjian. Movements of coho salmon in Lake Michigan interpreted from spatial variation in angler catch per unit effort. *Transactions of the American Fisheries Society*.
- Price, J., D.M. Mason, and **E.S. Rutherford**. Evaluation of fixed-location, riverine, hydroacoustics for enumerating out-migrating Chinook Salmon *Oncorhynchus tshawytscha* smolts. *North American Journal of Fisheries Management*.

Refereed Book Chapters, Conference Proceedings, Reports:

- Rutherford, E. S.**, and K. A. Rose. **2016**. Individual-Based Model Analysis of Walleye and Yellow Perch Population Dynamics in Response to Changing Ecosystem Conditions. Pages 427-452 *in* L.G. Rudstam, E.L. Mills, J.R. Jackson and D.J. Stewart, editors. *Oneida Lake: Long Term Dynamics of a Managed Ecosystem and its Fishery*. American Fisheries Society, Bethesda, MD.
- Moll, R. A., C. S. Sellinger, **E. S. Rutherford**, J. L. Johnson, M. R. Fainter, and J. E. Gannon. **2013**. The Great Lakes Ecosystems. Chapter 1, *In* W.W. Taylor and P. Ferrari (eds.), *Great Lakes Fisheries Policy and Management*. Michigan State University Press.
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- Rutherford, E. S.**, L. A. Mason, and J. T. Breck. 2012. Development of a GIS for Inventory, Classification, and Management of Non-Game Wildlife in Great Lakes Waters. Michigan State Wildlife Program Final Project Rept No. T-10-T-2, Study No. 237000. 57 pp.
- Zorn, T. G., P. W. Seelbach, **E. S. Rutherford**, T. C. Wills, S.-T. Cheng, and M. J. Wiley. **2008**. A regional-scale habitat suitability model to assess the effects of flow reduction on fish assemblages in Michigan streams. Michigan Department of Natural Resources, Fisheries Research Report 2089, Ann Arbor.
- Rutherford, E.S. 2008**. Lake Michigan's tributary and nearshore fishery habitats. *In* The state of Lake Michigan in 2005. *Edited by* D.F. Clapp and W. Horns. Great Lakes Fish. Comm. Spec. Pub. 08-02. pp. 7-18.
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- Rutherford, E. S.**, and C. A. Geddes. **2007**. Ecological Classification of Nearshore and Open-Water Fish Habitats in the Great Lakes. Final Report, Michigan State Wildlife Grant program, Michigan Dept Natural Resources Fish. Res. Grant # 237000. 12 pp.
- Rutherford, E.S.**, C.A. Geddes, and M. Kimura. **2006**. Final Report: "Lake Erie Aquatic Habitat Geographic Information System" to US Fish and Wildlife Service and Michigan Dept. Natural Resources. 15 pp.
- Beletsky, D., D.J. Schwab, D.M.Mason, **E.S. Rutherford**, M.J. McCormick, H. Vanderploeg, and J. Janssen. **2003**. Modeling the transport of larval yellow perch in Lake Michigan. Proceedings of Estuarine and Coastal Management Conference.
- Rutherford, E.S. 2002**. The unique contributions of early life history stages to fisheries management. Ch. 9, In L. Fuiman and R.G. Werner (eds.), *The Unique Contributions of Early Life Stages to Fisheries Science*. Blackwell Science, London.
- Woldt, A.P., and **E.S. Rutherford. 2002**. Production of young steelhead in two central Lake Michigan tributaries. Michigan Department of Natural Resources, Fisheries Research Report 2060. Ann Arbor.
- Rose, K. A., J. A. Tyler, D. Singh Dermott, and **E. S. Rutherford. 1996**. Multispecies modeling of fish populations. pp. 194-222. In: B.A. Megrey and E. Moksness [eds.], *Computers in Fisheries Research*. Chapman and Hall, London.
- Rask, M., van Densen, W., Lehtonen, H., and **Rutherford, E.S.** (editors). **1995**. Percis II. The second international percid fish symposium, Vaasa Finland, 21-25 August, 1995. *Annales Zoologici Fennici* Vol. 33 (3-4).
- Rutherford, E.S. 1997**. Evaluation of natural reproduction, stocking rates, and fishing regulations for steelhead *Oncorhynchus mykiss*, chinook salmon O.

tschawystscha, and coho salmon (O. keta) in Lake Michigan. Final Report Project No. F-35-R-22, study 650, to Federal Aid for Sport Fish Restoration. 29 pp.

Houde, E.D., **E.S. Rutherford**, and S.D. Leach. **1996**. Interactions among environmental factors and recruitment potential in striped bass. Reference No.[UMCEES]CBL 96-107, Contract No. CB94-011-002 to Maryland Department of Natural Resources, Chesapeake Bay Research and Monitoring Division. 214 pp.

Rutherford, E. S., T. W. Schmidt, and J. T. Tilmant. **1986**, The Early Life History of Spotted Seatrout, Red Drum, Gray Snapper, and Snook in Everglades National Park, Florida. South Florida Research Center Rept 86/07. 99 pp.

Rutherford, E. S., E. B. Thue, and D. G. Buker. **1983**. Population Structure, Food Habits, and Spawning Activity of Gray Snapper, Lutjanus griseus, in Everglades National Park. South Florida Research Center Rept. 83/02. 41 pp.

Rutherford, E. S., E. B. Thue, and D. G. Buker. **1982**. Population Characteristics, Food Habits and Spawning Activity of Spotted Seatrout, Cynoscion neulosus, in Everglades National Park, Florida. South Florida Research Center Rept. T-668. 48 pp.

Thue, E. B., **E. S. Rutherford**, and D. G. Baker. **1982**. Age, growth and mortality of the Common Snook, *Centropomus undecimilias* (Bloch), in Everglades National Park, Florida. South Florida Research Center Rept. T683. 32 pp.

Research Presentations at Conferences (last 3 years; * indicates presenter):

2015:

**Rutherford, E. S., H. Zhang, M.A. Barnes, D.C. Finnoff, W.L. Chadderton, A. Shakoor, D.M. Mason, M.E. Wittmann, D.M. Lodge, J. Apriesnig, T. Warziniack. Run DMC! Forecasting Ecological Impacts of Dreissenid Mussel Control on Great Lakes Food Webs. International Association for Great Lakes Research (IAGLR) 2015 meeting, Univ. Vermont, May, 2015.*

2014:

**Rutherford, E. S., H. A. Vanderploeg, J. Liebig, J. Cavaletto, D. Mason, C. Stow, T. Nalepa, T. Johengen, D. Bunnell, D. Warner, and T. O'Brien. NOAA CSMI sampling, Lake Huron 2012. Presentation to Lake Huron Technical Committee, Jan. 22 2014, Port Huron, MI.*

**Rutherford, E. S., H. A. Vanderploeg, J. Liebig, J. Cavaletto, D. Mason, C. Stow, T. Nalepa, T. Johengen, D. Bunnell, D. Warner, and T. O'Brien. NOAA CSMI sampling, Lake Huron 2012. Presentation to the Lake Huron Committee, March 24, 2014, Windsor, Canada.*

Kao, Y.-C. S. Adlerstein, *E. S. Rutherford, and H. Zhang. Identifying ecological tipping points for a Great Lakes food web: an Ecopath with Ecosim analysis. Joint Aquatic Sciences Meeting meeting, Portland Oregon, May 2014.

*Rutherford, E.S., A. Shakoob, K. Bouma-Gregson, H. Zhang², D. M. Mason, D. M/ Lodge, M. E. Wittmann⁴, J. T. Breck⁵, and H. A. Vanderploeg. Relative Importance of Timing, Life History, and Habitat of Non-Indigenous Species for Invasion Success and Impact in Great Lakes Ecosystems. Joint Aquatic Sciences Meeting meeting, Portland Oregon, May 2014.

*Rutherford, E. S., H. A. Vanderploeg¹, J. Cavaletto, J. Liebig, D. Mason; T. Nalepa, T. Johengen, D. Burnette, D. Wells, K. Mabrey; D. Bunnell, D. Warner, T. O'Brien, and J. E. Johnson. Effects of spatial and temporal variability in lower food web dynamics on larval fish feeding growth and survival in Thunder Bay, Lake Huron, 2012. IAGLR 2014 meeting, McMaster University, May, 2014.

Rutherford, E.S., H. A. Vanderploeg, J. Cavaletto, J. Liebig, S. Pothoven, D. M. Mason; A. Hoover, D. Burnette, D. Wells, K. Mabrey; D. Bunnell, D. Warner, *T. O'Brien; J. E. Johnson; and H. Carrick. Compensatory Response of the Lower Food Web and Larval Fish Growth and Survival to Multiple Stressors in Lake Michigan and Lake Huron. American Fisheries Society Annual Meeting, Quebec, CA., August 2014.

*BALDRIDGE, A.K., G.L. FAHNENSTIEL, J.R. LIEBIG, T.F. NALEPA, S.A. POTHOVEN, E.S. RUTHERFORD, and H.A. VANDERPLOEG. Exploring the relative impacts of climate change and dreissenid mussels on the Lake Michigan zooplankton community. 57th Annual Conference of the International Association for Great Lakes Research, McMaster University, Hamilton, Ontario, Canada, May 26-30, 2014 (2014).

2013:

*Rutherford, E. S. Forecasting impacts of invasive species on Great Lakes food webs and fisheries. Invited talk to NOAA OAR headquarters on GLERL research efforts for ecosystem forecasting. Jan. 30, 2013.

*Rutherford, E. S., H. Zhang, J. Breck, D. Mason, X. Zhu, T. Johnson, Roger M. Cooke, M. E. Wittmann, D. M. Lodge, J. R. Rothlisberger. Assessing Risk of Asian Carp invasion on Lake Erie's food web. ICAIS 2013 meeting, Niagara Falls, Ontario, April 22, 2013..

Alderstein, S.A., S. Kao, and *E.S. Rutherford. Nutrient tipping points for Great Lakes nearshore food webs: an Ecopath with Ecosim analysis. 56th Annual Conference of the International Association for Great Lakes Research, Purdue University, W. Lafayette, IN, June 2-6, 2013 (2013).

Alderstein, S.A., Y.C. Kao, *E.S. Rutherford, and H. Zhang. Relative impacts of nutrient loadings and invasive species on a Great Lakes food web: an Ecopath with Ecosim

analysis. 56th Annual Conference of the International Association for Great Lakes Research, Purdue University, W. Lafayette, IN, June 2-6, 2013 (2013).

Breck, J.E., and E.S. *RUTHERFORD. Forecasting impacts of future invaders on Lake Erie's food web. 56th Annual Conference of the International Association for Great Lakes Research, Purdue University, W. Lafayette, IN, June 2-6, 2013 (2013).

*IVAN, L., D.M. MASON, E.S. RUTHERFORD, H. ZHANG, and M. Hoff. Assessing the risk of Asian carps establishment in the Great Lakes across productivity gradients. 56th Annual Conference of the International Association for Great Lakes Research, Purdue University, W. Lafayette, IN, June 2-6, 2013 (2013).

*IVAN, L., H. ZHANG, D.M. MASON, E.S. RUTHERFORD, and M. Hoff. Modeling the impacts of Asian carps in the Great Lakes: A case study in nearshore and offshore Lake Huron. American Society for Limnology and Oceanography (ASLO) American Society for Limnology and Oceanography Annual Meeting (2013), Learning for the Future, New Orleans, LA, February 17-22, 2013.

*LIEBIG, J.R., H.A. VANDERPLOEG, G.A. LANG, J.F. CAVALETTO, E.S. RUTHERFORD, S.A. RUBERG, and S.A. CONSTANT. Diel vertical migration patterns in Lakes Michigan and Huron observed at fine spatial and temporal scales using the laser optical plankton counter (poster). 56th Annual Conference of the International Association for Great Lakes Research, Purdue University, W. Lafayette, IN, June 2-6, 2013 (2013).

*Marin Jarrin, J.R., K. Pangle, M. Xia, S.A. Ludsin, D.M. MASON, and E.S. RUTHERFORD. Linking river discharge and wind-driven currents to the success of larval yellow perch in western Lake Erie. 56th Annual Conference of the International Association for Great Lakes Research, Purdue University, W. Lafayette, IN, June 2-6, 2013 (2013).

*MASON, D.M., H. ZHANG, E.S. RUTHERFORD, L. IVAN, D. BELETSKY, A.T. Adamack, M. Hoff, E.A. Fulton, R.P. Barbiero, and R.J. Gorton. Forecasting Asian carp impacts on Lake Michigan's food web and fisheries: Using the Atlantis ecosystem model. 56th Annual Conference of the International Association for Great Lakes Research, Purdue University, W. Lafayette, IN, June 2-6, 2013 (2013).

*Mason, L.A., C.M. Riseng, D.K. Forsyth, B.L. Sparks-Jackson, L. Wang, E.S. RUTHERFORD, K.E. Wehrly, J.E. McKenna, C. C., L.B. Johnson, and S.P. Sowa. Great Lakes Aquatic Habitat Framework: Creating a common spatial grid for sharing physical, geochemical, and biological data across the entire Great Lakes basin. 56th Annual Conference of the International Association for Great Lakes Research, Purdue University, W. Lafayette, IN, June 2-6, 2013 (2013).

*RUTHERFORD, E.S., H.A. VANDERPLOEG, J.F. CAVALETTO, J.R. LIEBIG, S.A. POTHOVEN, D.M. MASON, D. Burnette, P. Bourdequ, S.D. Peacor, R. Claramunt, D.B. Bunnell, E. Roseman, T. O'Brien, and D.M. Warner. Consequences of altered spatial structure of zooplankton for fish larvae growth and survival in newly illuminated environments of Lake Michigan and Lake Huron. 56th Annual Conference of the International Association for Great Lakes Research, Purdue University, W. Lafayette, IN, June 2-6, 2013 (2013).

*STURTEVANT, R.A., A.J. FUSARO, E.S. RUTHERFORD, L. BERENT, A. Bogdanoff, J. Larson, M. McCarthy, G.C. NUNEZ, and K. Dettloff. Great Lakes invasive species organism impact assessments. 56th Annual Conference of the International Association for Great Lakes Research, Purdue University, W. Lafayette, IN, June 2-6, 2013 (2013).

*Tyler, J., E.S. RUTHERFORD, M. Wiley, C.M. Riseng, B. Pijanowski, and D. Hyndman. Changes in land use and urban development on salmonid production in the Muskegon River: A multi-modelling analysis focused on Chinook and Steelhead. 56th Annual Conference of the International Association for Great Lakes Research, Purdue University, W. Lafayette, IN, June 2-6, 2013 (2013).

*VANDERPLOEG, H.A., J.R. LIEBIG, J.F. CAVALETTO, E.S. RUTHERFORD, D.M. MASON, S.A. RUBERG, S.A. CONSTANT, S.A. POTHOVEN, G.L. FAHNENSTIEL, T.F. NALEPA, D.B. Bunnell, D.M. Warner, C.P. Madenjian, S.D. Peacor, and R. Pichlova-Ptacnikova. Life on the edge: Remarkable changes in spatial connections of the pelagic food webs of Lakes Michigan and Huron over the diel cycle and across years. 56th Annual Conference of the International Association for Great Lakes Research, Purdue University, W. Lafayette, IN, June 2-6, 2013 (2013).

*ZHANG, H., E.S. RUTHERFORD, D.M. MASON, L. IVAN, D. BELETSKY, A.T. Adamack, M. Hoff, E.A. Fulton, R.P. Barbiero, and B. Gorton. Forecasting Asian carp impacts on Lake Michigan's food web and fisheries - using the Atlantis ecosystem model. ASLO 2013 Aquatic Sciences Meeting, Learning for the Future, New Orleans, LA, February 17-22, 2013. ASLO (2013).

Sessions organized at Scientific Conferences or Workshops:

- Co-organized a coastal conservation workshop at IAGLR, 2008 at Trent University.
- Co-chaired a workshop on "Adaptations to Climate Change" at the national conference "Adapting to Climate Change" May 2007, Ann Arbor MI.
- Co-chaired a session on "Anthropogenic Effects on Great Lakes Aquatic Food Webs" at the 48th Annual Meeting of the International Association for Great Lakes Research, 2005, in Ann Arbor, MI
- Co-chaired a session on "Physical-Biological Coupling in Large Lakes" at the 48th Annual Meeting of the International Association for Great Lakes Research, 2005, in Ann Arbor, MI.

- Co-organized the 48th Annual Meeting of the International Association for Great Lakes Research, 2005, in Ann Arbor, MI.
- Organized and ran the 22nd Annual Meeting of the Early Life History Section of American Fisheries Society, 1998, Ann Arbor, MI..

Service

UM-SNRE Promotion and Tenure Committee Review for D. Beletsky, T. Johengen, C/. Riseng, H. Zhang)
Associate Editor, Journal of Great Lakes Research (2012-present)

Teaching

Guest Lecturer, Great Lakes Science and Management (NRE 538) Winter 2014-2016
Seminar on Marine Protected Areas (NRE 639 066) Winter 2009.
Fisheries Conservation and Management (NRE 639_066) Winter 2008.
Fish Ecology (NRE/ENVIRON 409) Winter 2000-04.
Fisheries Science (NRE 460) Fall 1995, 1997, 1999, 2001, 2003
River Restoration Seminar (co-taught with Michael Moore NRE 609) Winter 2001.

Past Graduate Advisees (total=33)

Past Graduate Students: Brian Brenton, Su-Ting Cheng, Sara Creque, Solomon David, Michelle DePhilip, Christine Diana, Matthew Diana, Angela Giuliano, Neal Godby, David Halsing, Tomas Höök, Darryl Hondorp, Brad Horne, Dana Infante, Lori Ivan, Yu-Chun Kao, Damon Krueger, Brian McCrae, Katharine Marko, Thomas Neeson, James Roberts, Hideaki Sano, Larissa Sano, Bryan Sederberg, David Swank, Hui-Yu Wang, Aaron Woldt, Sarah Zorn (University of Michigan); Meredith Bartron (Michigan State University); Susan Doka (McMasters University); Brian Lantry (Cornell University); Ali Shakoor.

Mentor for Univ. Michigan CILER Summer Fellows: Aimee Hoover (2010), Keith Hayes-Gregson (2011), Dana Burnette (2012), David Wells (2013), Drew Eppehimer (2015)

Current Graduate Advisees: Michael Fainter (Univ. Michigan)

Research Associates: Jason Breck, Lacey Mason, Christine Geddes Joseph, Minako Kimura-Edgar, Emily Marshall, Christine Folz, Shannon Brines

Research Grants:

Current:

1. *Empowering local communities with Online Action Planning Tools: Tipping Points and Indicators for Improving Water Quality Across the Great Lakes.* E. Rutherford (P.I.), B. Miller, B. Pijanowski, and D. Hyndman (co-PIs). \$407,568 from US EPA, Great Lakes Restoration Initiative. Oct. 2015 – Sept. 2016.

2. *The Great Lakes Aquatic Habitat Framework*. Great Lakes Fisheries Trust \$527,229. E.S. Rutherford (co-PI), Catherine Riseng (PI), Kevin Wehrly and L. Wang (co-PIs). 2014-2016.
3. *Forecasting biological and economic impacts of aquatic invasive species in Lake Michigan*. D. Finnoff (P.I.), H. Zhang, F. Lupi, and E. Rutherford (co-PIs). \$246,829 Great Lakes Fisheries Trust. 2015-2017.

Past:

4. *Forecasting spread and bioeconomic impacts of aquatic invasive species from multiple pathways to improve management and policy in the Great Lakes*. NOAA CSCOR, \$2,000,000. E.S. Rutherford (co-PI), David Lodge (PI, Univ. Notre Dame), and several others. Oct. 1 2010-Sept 30, 2015.
5. *Assessing risk of Asian carp invasion and impacts on Great Lakes food webs and fisheries*. US EPA, Great Lakes Research Initiative, \$700,000. **E.S. Rutherford** (PI), D. M. Mason, H. Zhang, A. Adamack co-PIs. Oct. 1 2011-Sept. 30 2012.
6. *Identify land use indicators and tipping points that threaten Great Lakes ecosystems*. US EPA, Great Lakes Research Initiative, \$1,204,275. D.M. Mason (P.I.), **E.S. Rutherford**, D. M. Mason, M.J. Wiley, R.J. Stevenson, B. Pijanowski, D. Hyndman, J. Rose, S. Adlerstein-Gonzalez, and J.A. Tyler (co-PIs). 2010-2012.
5. *ECOFOR 2006: Assessing the causes, consequences and remedies for hypoxia in Lake Erie*. NOAA CSCOR, \$2,200,000. **E.S. Rutherford** (co-PI), Donald Scavia (PI, UM) and several others.
6. *Development of a GIS for inventory, classification and management of non-game wildlife in Great Lakes waters*. Michigan DNR, \$390,000, Oct 1 2007- Sept 30, 2010. **E.S. Rutherford** (P.I.)
7. *Development of a GIS-based decision support tool for evaluating windfarm sitings in Great Lakes aquatic habitats*. U. S. Dept. of Energy. \$100,000. **E. S. Rutherford** (co-PI); L. Wang (PI); J. T. Breck co-PI.
8. *Impacts of multiple stressors on Lake Huron Fish Communities, 1970-2004: an integrative analysis*. **E.S. Rutherford** (co-PI), with P.I. Sara Adlerstein, R. Haas, D. Fielder, L. Mohr, J. Johnson, and S. Riley. Great Lakes Fisheries Commission.
9. *Quantitative tools to predict sea lamprey production based on habitat: prioritizing dam removal and control decisions - Development of a sea lamprey habitat model*. **E.S. Rutherford** (co-P.I.), with E. Silverman (P.I.), M.J. Wiley and S.A. Adlerstein. Great Lakes Fisheries Commission.
10. *Classification and Analysis of Great Lakes Fisheries Habitats*. \$537,240, 2003-2008.

MDNR Fisheries Division. **E.S. Rutherford** (P.I.)

11. Reproductive and Recruitment Success of Walleye in the Muskegon River. \$82,732 from Michigan Dept Natural Resources. C. Ruetz, Grand Valley State University (PI), **E. S. Rutherford** (co-PI), University of Michigan. Jan 2009-Dec. 2010.
12. Poor quality of spawning habitat: a serious impediment to Cisco rehabilitation in the Great Lakes? \$74,601 from Great Lakes Restoration Act. **E.S. Rutherford** (PI), C. Madenjian (USGS Great Lakes Science Center, co-PI). June 2008 – Aug 2010.
13. *Development of GIS – based decision support system for evaluation of lake-bed alterations.* \$50,000 from Michigan Dept. Environmental Quality. E.S. Rutherford (P.I.) with C.A. Geddes. Jan 2010 – Mar 2011.
14. *Development of a GIS for Great Lakes Aquatic Habitats.* \$271,000. 2004-2007. From USFWS and Great Lakes Fisheries Commission. **E.S. Rutherford (P.I.)**, with 4 others.
15. *Impacts of multiple stressors on the Saginaw Bay fish community.* Michigan Sea Grant, **E.S. Rutherford (co-P.I.)**, with P.I. Sara Adlerstein and five others.
16. *Evaluation of Ecoregion Classifications and Development of Reference Conditions for Great Lake Fisheries Habitats.* \$63,000. 2004-2005. MDNR Fisheries Division. **E.S. Rutherford (P.I.)**.
17. *Fish Recruitment at the Interface of the Great Lakes and their Watersheds: (An Addendum to enhance current projects of the Muskegon River Initiative).* 2003-2007. \$900,000 from Great Lakes Fisheries Trust, 2003-2007. **E.S. Rutherford (co-P.I.)**, with MJ Wiley (PI, UM) and several others.
18. *Development of Environmental Objectives for Lake Michigan.* \$60,000 from Great Lakes Fishery Commission. **E.S. Rutherford** (P.I.)
19. *Watershed – Great Lakes Interactions: Defining the Ecological Footprint of the Muskegon River Watershed in Nearshore Lake Michigan.* \$100,000 from University of Michigan Office of Vice President for Research, 11/1/02 – 10/31/03. **E.S. Rutherford** (P.I.), M. Wiley, T. Johengen, D. Jude, S. Adlerstein, J. Diana, B. Eadie, D. Mason.
20. *Impacts of nutrient reduction and exotic species invasion on fish community composition and growth in Saginaw Bay, Lake Huron.* \$134,000 from Michigan Sea Grant. 3/1/03 – 2/28/05. **E.S. Rutherford** (Co-P.I.), with S. Adlerstein (PI, UM), T. Nalepa (NOAA), R. Haas and M. Thomas (MDNR)..

21. *Development of GIS-based analysis of tagging and cpue data for walleye and yellow perch in Lake Erie.* \$76,000 from Great Lakes Fishery Commission. 9/1/01 – 7/1/03. **E.S. Rutherford** (PI).
22. *Review of Procedures for estimating wild production of chinook salmon through Marking Experiments.* \$16,669 from Great Lakes Fishery Commission. 9/01/01 – 8/30/02. **E.S. Rutherford** (PI), and J.R. Bence (MSU).
23. *Modeling the influence of lake circulation patterns, upwelling events and turbulence on fish recruitment variability in Lake Michigan.* \$350,419 from Great Lakes Fisheries Trust. 9/1/01 – 8/31/04. **E.S. Rutherford** (Co-P.I.), with D. Beletsky (P.I.), D. Schwab, H. Vanderploeg and D.Mason (NOAA), , and J. Janssen (Univ. Wisconsin).
24. *Development of GIS for Great Lakes Fisheries Analysis.* \$300,000 from Michigan Department of Natural Resources. 10/1/01-9/30/04. **E.S. Rutherford** (PI).
25. *Dynamics of Alewife Recruitment Variability in Lake Michigan.* \$358,456 from Great Lakes Fisheries Trust. 9/01/00 – 8/31/03. **E,S, Rutherford** (PI), Co-P.I.'s D. Mason (NOAA), C. Madenjian (USGS), and W. Patterson (Syracuse University).
26. *Salmonid Spawning Stock Abundance, Recruitment, and Exploitation in the Muskegon River, Michigan.* \$306,000 from Great Lakes Fisheries Trust. 9/1/99 – 8/30/02. **E.S. Rutherford** (Co-P.I.), with D. Mason (PI, NOAA).
27. *Impacts of Watershed Fragmentation and Restoration on Fish Habitat, Migration and Production in Great Lakes Tributaries.* \$206,181 from the Great Lakes Protection Fund. 9/1/99 – 8/31/02. **E.S. Rutherford** (PI), Co-P.I.'s J. Tyler (Worcester Polytechnic University), P. Seelbach (Michigan DNR), J. Diana (UM-SNRE) and K. Wehrly (Michigan DNR)
28. *Development of a Geographical Information System for Great Lakes Fisheries.* \$280,000 from Michigan Department of Natural Resources. 4/1/98 – 9/30/01. **E.S. Rutherford** (PI).
29. *Ecological and Economic Consequences of hydropower-related watershed restoration on salmonid production in Great Lakes Tributaries.* \$139,655 from Michigan Sea Grant, 3/1/99 – 2/28/01. **E.S. Rutherford (PI)** Co-P.I.'s M. Moore (UM-SNRE), K. Wehrly (EPA), F. Lupi and J. Hoehn (Michigan State University).
30. *Ecological and Economic Impacts of Watershed Restoration on Salmonid Productivity in Lake Michigan Tributaries.* \$106,455, funded by Michigan Sea Grant. 3/1/97 – 2/28/99.. **E.S. Rutherford (Co-P.I.)**, with M. Moore (PI, UM-SNRE), J. Hoehn and F. Lupi (Michigan State University).

31. *Abundance, Production and Harvest of Potamodromous Salmonids in the Manistee, Muskegon and Au Sable Rivers.* \$537,000 from Michigan Department of Natural Resources. 10/1/95 - 9/30/99. **E.S. Rutherford (PI)**, E.S. Co-P.I. S. Thorrold (Old Dominion University).
32. *Bioenergetics model of ruffe trophic energetics in the Great Lakes.* \$107,800 from National Sea Grant. 10/1/95 – 9/30/98. E.S. **Rutherford (Co-P.I.)**, C. Richards (PI University of Minnesota, and 8 others at Univ. Notre Dame and Univ. Cincinnati).
33. *Individual-based bioenergetics model of walleye and yellow perch in Oneida Lake, New York.* Reward \$19,996 from Martin Marietta Corp. (Department of Energy). 2/1/95 – 12/31/95. **E.S. Rutherford (PI)**.
34. *Evaluation of natural reproduction, stocking rates, and fishing regulations for steelhead, chinook salmon, and coho salmon in Lake Michigan.* \$66,930 from Michigan Department of Natural Resources (MDNR). 10/1/95 – 9/30/97. **E.S. Rutherford (P.I.)**.
35. *Interactions Among Environmental Factors and Recruitment Potential in Striped Bass.* \$8,504 (subcontract) from Maryland Department of Natural Resources (3/30/95 – 4/30/96). **E.S. Rutherford (Co-P.I.)**, with E. Houde (PI, University of Maryland).