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**Edward S. Rutherford**

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University of Michigan

School of Natural Resources and Environment

edwardr@umich.edu

Institute for Fisheries Research

1109 N. University Ave.

Ann Arbor, MI. 48109-1084

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Phone (734)-663-3554

FAX (734)-663-9399

Internet:

**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**

Interim Director (June 2007 – present) University of Michigan Cooperative Institute for Limnology and Ecosystems Research; Associate Research Scientist, University of Michigan, Ann Arbor, MI. (2003-present); 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, American Association for Advancement of Science, International Association for Great Lakes Research

**Publications**

- Adlerstein, S.A., **E.S. Rutherford**, R.M. Claramunt, D.F. Clapp and J.A. Clevenger. 2008. Seasonal movements of Chinook salmon in Lake Michigan based on tag recoveries from recreational fisheries and catch rates in gill net assessments Transactions of the American Fisheries Society 138 (3):137-150.
- Höök, T.O., **E.S. Rutherford**, T.E. Croley, D.M. Mason and C.P. Madenjian. In press. Annual variation in habitat-specific recruitment success: implications from an individual-based model of Lake Michigan alewife. Canadian Journal of Fisheries and Aquatic Sciences.
- Höök, T.O., **E.S. Rutherford**, G.S. Carter, and D.M. Mason. 2007. Hatch dates, growth, survival and over-winter mortality of age-0 alewives in Lake Michigan: Implications for habitat-specific recruitment success. Transactions of the American Fisheries Society 136:1298-1312.
- Beletsky, D., D.M. Mason, D.J. Schwab, **E.S. Rutherford**, J. Janssen, D.F. Clapp, and J. Dettmers. 2007. Biophysical model of larval yellow perch advection and

- settlement in Lake Michigan. *J. Great Lakes Res.* 33 (4):842-866.
- Adlerstein, S.A., **E.S. Rutherford**, J.A. Clevenger, J.E. Johnson, D.F. Clapp, and A.P. Woldt. 2007. Lake Trout Movements in US Waters of Lake Huron Interpreted from Coded Wire Tag Recoveries in Recreational Fisheries. *Journal of Great Lakes Research* 33:186-201.
- Godby, N.A., Jr., **E.S. Rutherford**, and D.M. Mason. 2007. Diet, consumption, growth, survival, and production of juvenile steelhead in a Lake Michigan tributary. *North American Journal of Fisheries Management* Vol. 27:578-592.
- Wang, H-Y, **E.S. Rutherford**, H.A. Cook, D.W. Einhouse, R.C. Haas, T.B. Johnson, R. Kenyon, B. Locke, M.W. Turner. 2007. Movement of Walleye in Lakes Erie and St. Clair Inferred from Tag Return and Fisheries Data. *Transactions of the American Fisheries Society* Vol. 136:539-551.
- Ruetz, C.R., III, D.G. Uzarski, D.M. Krueger, and **E.S. Rutherford**. 2007. Sampling a littoral fish assemblage: comparing small-mesh fyke netting and boat electrofishing. *North American Journal of Fisheries Management*. 27:825-831.
- Adlerstein, S.A., **E.S. Rutherford**, D. Clapp, J.A. Clevenger and J.E. Johnson. In press. Estimating seasonal movements of Chinook salmon in Lake Huron from efficiency analysis of coded wire tag recoveries from recreational fisheries. *North American Journal of Fisheries Management* 27(3):792-803.
- Tyler, J.A., and **E.S. Rutherford**. 2007. River Restoration Effects on Steelhead Populations in the Manistee River, Michigan: Analysis using an Individual-Based Model. *Transactions of the American Fisheries Society* 163(6):1654-1673.
- Höök, T.O., M.J. McCormick, **E.S. Rutherford**, D.M. Mason and G.S. Carter. 2006. Short-term water mass movements in Lake Michigan: implications for larval fish transport. *Journal of Great Lakes Research* 32:728-737.
- Kotchen, M.J., M.R. Moore, F. Lupi and **E.S. Rutherford**. 2006. Environmental Constraints on Hydropower: An Ex-Post Benefit-Cost Analysis of Dam Relicensing in Michigan. *J. Land Economics* 82(3):384-403.
- Plattner, S., D.M. Mason, G.A. Leshkevich, D.J. Schwab and **E.S. Rutherford**. 2006. Classifying and forecasting coastal upwellings in Lake Michigan using satellite derived temperature images and buoy data. *J. Great Lakes Research* 32:63-76.
- Creque, S.M., **E.S. Rutherford** and T.G. Zorn. 2005. Use of GIS-derived landscape-scale habitat features to explain spatial patterns of fish density in Michigan Rivers. *North American Journal of Fisheries Management*. 25(4):1411-1425.
- Dufour, E., W.P. Patterson, T.O. Höök, and **E.S. Rutherford**. 2005. Early life history of Lake Michigan alewives (*Alosa pseudoharengus*) inferred from intra-otolith stable isotope ratios. *Canadian Journal of Fisheries and Aquatic Sciences* 62(10):2362-2370.
- Madenjian, C.P., T.O. Höök, **E.S. Rutherford**, D.M. Mason, T. Croley, II, E.S. Szalai, and J.R. Bence. 2005. Recruitment Variability of Alewives in Lake Michigan. *Transactions of the American Fisheries Society* 134(1):218-230.

- Bartron, M.L., D.R. Swank, **E.S. Rutherford**, and K.T. Scribner. 2004. Methodological bias in estimates of strain composition and straying rates of hatchery-produced steelhead in Lake Michigan tributaries. *North American Journal of Fisheries Management* 24:1288-1299.
- Höök, T., **E.S. Rutherford**, S.J. Brines, D.J. Schwab, and M.J. McCormick. 2004. Relationships between surface water temperature and steelhead distributions in Lake Michigan. *North American Journal of Fisheries Management* 24:211-221.
- Horne, B.D., **E.S. Rutherford**, and K.W. Wehrly. 2004. Simulating effects of hydrodam alteration on thermal regime and wild steelhead recruitment in the Manistee River, Michigan. *River Research and Applications* 20:185-203.
- Rutherford, E.S.**, K.A. Rose, and J.H. Cowan, Jr. 2003. Evaluation of the Shepherd and Cushing (1980) model of density-dependent survival: a case study using striped bass (*Morone saxatilis*) larvae in the Potomac River, Maryland, USA. *ICES Journal of Marine Science* 60:1275-1287.
- 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.
- Rutherford, E.S.**, K.A. Rose, J.L. Forney, E.L. Mills, C.M. Mayer and L.G. Rudstam. 1999. Individual-based model simulations of a zebra mussel (*Dreissena polymorpha*) induced energy shunt on walleye (*Stizostedion vitreum*) and yellow perch (*Perca flavescens*) populations in Oneida Lake, NY. *Canadian Journal of Fisheries and Aquatic Sciences* 56:2168-2160.
- Rose, K.A., **Rutherford, E.S.**, Forney, J.L., Mills, E.L., and SinghDermott, D. 1999. Individual-based model of yellow perch and walleye populations in Oneida Lake, New York. *Ecological Monographs* 69:127-154.
- Rutherford, E.S.**, E.D. Houde, and R.M. Nyman. 1997. Relationship of larval-stage growth and mortality to recruitment of striped bass, *Morone saxatilis*, in Chesapeake Bay. *Estuaries* 20:174-198.
- Rutherford, E.S.**, and Houde, E.D. 1995. The influence of temperature on cohort-specific growth, survival and recruitment of larval striped bass, *Morone saxatilis*, in Chesapeake Bay. *Fishery Bulletin, U.S.* 93:315-332.

- Cowan, J.H., Jr., Rose, K.A., **Rutherford, E.S.**, and Houde, E.D.. 1993. Individual-based model of young-of-the-year striped bass population dynamics. II. Factors affecting recruitment in the Potomac River, Maryland. *Transactions of the American Fisheries Society* 122:439-458.
- Houde, E.D., and **Rutherford, E.S.**. 1993. Recent trends in estuarine fisheries: Predictions of fish production and yield. *Estuaries*. 16(2):161-176.
- Rutherford, E. S.**, Tilmant, J.T., Thue, E.B., and Schmidt, T.W.. 1989. Fishery harvest and population dynamics of spotted seatrout, *Cynoscion nebulosus*, in Florida Bay and adjacent waters. *Bulletin of Marine Science* 44:108-125.
- Rutherford, E. S.**, Tilmant, J.T., Thue, E.B., and Schmidt, T.W.. 1989. Fishery harvest and population dynamics of gray snapper, *Lutjanus griseus*, in Florida Bay and adjacent waters. *Bulletin of Marine Science* 44:139-154.
- Rutherford, E. S.**, Schmidt, T.W., and Tilmant, J.T.. 1989. Early life history of spotted seatrout, *Cynoscion nebulosus*, and gray snapper, *Lutjanus griseus*, in Florida Bay, Everglades National Park, Florida. *Fishery Bulletin* 44:49-64.
- Tilmant, J.T., **Rutherford, E.S.**, and Thue, E.B. 1989. Fishery harvest and population dynamics of the common snook (*Centropomus undecimalis*) from Florida Bay and adjacent waters. Abstract In: Symposium on Florida Bay, a subtropical lagoon. *Bulletin of Marine Science* 44:52:53
- Scott, J. P., Dewey, R.R., Hansen, L.J., Owen, R.E., and **Rutherford, E.S.**. 1989. How many mullet are there in Florida Bay? *Bulletin of Marine Science* 44:89-107.
- Iversen, E.S., **Rutherford, E.S.**, Bannerot, S.P., and Jory, D.E. 1987. Biological data on Berry Islands, (Bahamas) queen conchs, *Strombus gigas*, with mariculture and fisheries management implications. *Fishery Bulletin* 85:299-310

### **Manuscripts in Review**

- Dufour, E., T.O. Höök, W.P. Patterson, and **E.S. Rutherford**. In review. High-resolution isotope analysis of age-0 alewife *Alosa pseudoharengus* otoliths: assessment of temporal resolution and reconstruction of habitat occupancy and thermal history. *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*.

### **Manuscripts in Preparation**

- Rutherford, E.S.**, and Rose, K.A. Individual-based model analysis of dynamics of walleye and yellow perch populations under multiple ecosystem stressors in Oneida Lake, NY. In: E.L. Mills and D.J. Stewart (eds.), *Oneida Lake: Long-*

- term dynamics of a managed ecosystem and its fisheries. Published by American Fisheries Society
- 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. Nat'l Acad. Sci.
- Wang, Hui-Yu, and **E.S. Rutherford**. Bioenergetic growth potential of walleye in Lake Erie. Journal of Great Lakes Research. STATUS. A completed manuscript will be submitted by December 2007.
- Rutherford, E.S.** , and J.A.Tyler. Individual-based model simulations of steelhead response to flow variation in in Great Lakes tributaries. Journal of Great Lakes Research.
- Rutherford, E.S.**, Geddes, C.A., Schwab, D.G., Madenjian, C.P. and Mason, D.M. Ecological classification of offshore fisheries habitats of Lake Michigan. Canadian Journal of Fisheries and Aquatic Sciences.
- Rutherford, E.S.**, D.M. Mason, D. Zafft, R.F. Elliott, and L. Carl. Factors influencing spatial and temporal variability in recruitment of Chinook salmon to Lake Michigan. Transactions of the American Fisheries Society.
- Rutherford, E.S.**, and E.R. Marshall. Landscape-scale regression estimates of steelhead and Chinook salmon habitat suitability and recruitment in Lake Michigan tributaries. Canadian Journal of Fisheries and Aquatic Sciences
- Rutherford, E.S.**, E.R. Marshall and M. Kimura. Landscape-scale regression estimates of Chinook salmon habitat and potential recruitment to Lake Michigan. Journal of Great Lakes Research.
- Rutherford, E.S.**, S.R. Thorrold, and J. Christensen. Identification of natal habitats for juvenile steelhead using trace element and stable isotope analysis of steelhead otoliths and scales. Canadian Journal of Fisheries and Aquatic Sciences
- Rutherford, E.S.**, M. Kimura, S.Ludsin, E. Roseman, T. Johnson and D. Culver. Does bioenergetic growth potential predict habitat suitability and recruitment potential of yellow perch larvae in western Lake Erie? Transactions of the American Fisheries Society.
- 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.
- Woldt, A.P. and **E.S. Rutherford**. Production of young steelhead in two central Lake Michigan tributaries. Journal of Great Lakes Research.
- 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.
- Geddes, C.A. **E.S.Rutherford**, T.O., Höök, and C.P. Madenjian. Movements of coho salmon in Lake Michigan interpreted from angler catch per unit effort. Transactions of the American Fisheries Society.

- Höök, T.O., **E.S. Rutherford**, D.M. Mason, and G. Carter, G. Relative importance of nursery habitats for alewife in Lake Michigan. *Journal of Great Lakes Research*.
- 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*.
- Swank, D.R., and **E.S. Rutherford**. Spatial variation in life history traits of wild steelhead populations in the Great Lakes. *Can. J. Fish. Aquat. Sci.*

### **Refereed Book Chapters, Conference Proceedings, Reports,**

- Rutherford, E.S.**, and E.R. Marshall. 2007. Development of Environmental Objectives to support Fish Community Objectives for Lake Michigan. Report to the Great Lakes Fishery Commission.
- Rutherford, E.S.** 2007. Chapter “Tributary and Nearshore Fishery Habitats”. In: Lake Michigan State of the Lake 2005, published by the Great Lakes Fishery Commission.
- Rutherford, E.S.**, C.A. Geddes, and M. Kimura. Final Report: “Lake Erie Aquatic Habitat Geographic Information System” to Great Lakes Fishery Commission.
- Beletsky, D., D.J. Schwab, D.M. Mason, **E.S. Rutherford**, M.J. McCormick, H. Vanderploeg, and J. Janssen. Modeling the transport of larval yellow perch in Lake Michigan. *Proceedings of Estuarine and Coastal Management Conference*, 2003.
- 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. tshawytscha*, 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.

**Research Presentations at Conferences (last 3 years):**

*2007:*

Tyler, J.A., M.J. Wiley, C.R. Riseng, and **E.S. Rutherford**. Modeling flow-dependent fish habitat in the Lower Muskegon River: Linking hydrologic models with an individual-based model for steelhead. International Association of Great Lakes Research Annual Meeting, May 2007, University Park, PA.

**Rutherford, E.S.** Biology and fisheries of Lake Michigan steelhead. Presented April 2007 at Chicago chapter of Lake Michigan Steelheaders, Chicago, IL.

**Rutherford, E.S.** Synopsis of research on steelhead in Great Lakes tributaries. Presented March 2007 at Schaum's West Michigan Chapter of Trout Unlimited, Muskegon, MI.

Ivan, L.N., **E.S. Rutherford**, M.J. Wiley, C. Riseng and B. Sparks-Jackson. Longitudinal Trends in Stream Macroinvertebrates and Fishes in the Muskegon River, Watershed of Lake Michigan. International Association of Great Lakes Research Annual Meeting, May 2007, University Park, PA.

Kimura, M., **E.S. Rutherford**, and L. Stanfield. Landscape-habitat models of Chinook salmon recruitment in Lake Huron. International Association of Great Lakes Research annual meeting, May 2007, University Park, PA.

Tyler, J.A., M.J. Wiley, **E.S. Rutherford**, L.N. Ivan, and C.R. Riseng. Modeling flow-dependent fish habitat suitability in a Lake Michigan tributary. International Association of Great Lakes Research Annual meeting, May 2007, University Park, PA.

*2006:*

**Rutherford, E.S.** Recruitment Dynamics of Chinook Salmon in the Muskegon River Watershed. Presented April 2006 at Annis Water Resources Institute, Muskegon MI.

David, S.R. and **Rutherford, E.S.** Ecological Factors affecting Fish Communities in the Lower Muskegon River, MI. International Association of Great Lakes Research, May 2006, Windsor, CA.

- Ivan, L.N., and **Rutherford, E.S.** Ecological Impacts of Adfluvial Fish Spawning Migrations on a Lake Michigan tributary. International Association of Great Lakes Research, May 2006, Windsor, CA.
- Geddes, C.A., Tyson, J., Krueger, D.M., **Rutherford, E.S.**, Ludsin, S., and Johnson, T. Development of Ecological Classifications of Open-Water Habitats in Lakes Huron and Erie. International Association of Great Lakes Research, May 2006, Windsor, CA.
- Kimura, M., Ludsin, S., **Rutherford, E.S.**, Tyson, J., Johnson, T., and Mason, D.M. Estimating Habitat Quality and Recruitment Potential of Yellow Perch Larvae in Lake Erie. International Association of Great Lakes Research, May 2006, Windsor, CA.
- Tyler, J.A., Wiley, M.J., **Rutherford, E.S.**, Ivan, L.N., and Riseng, C.M. Modeling flow-dependent fish habitat suitability in a Lake Michigan tributary. International Association of Great Lakes Research, May 2006, Windsor, CA.
- Krueger, D.M., **Rutherford, E.S.**, and Mason, D.M. Predation as a mediator of Chinook salmon recruitment success in a large Lake Michigan tributary International Association of Great Lakes Research, May 2006, Windsor, CA.
- Rutherford, E.S.**, and D.R. Swank. Developing a Stock-Recruit relationship for steelhead from a Lake Michigan tributary. Annual Meeting of American Fisheries Society, Lake Placid, NY.
- Rutherford, E.S.**, and E.R. Marshall. Temporal and spatial variability in recruitment of Chinook salmon from Lake Michigan tributaries. Annual Meeting of American Fisheries Society, Lake Placid, NY.
- Rutherford, E.S.**, and K.A. Rose. Individual-based model simulations of multiple ecosystem stressors and fisheries management options in Oneida Lake, NY. . 2006 Annual Meeting of American Fisheries Society, Lake Placid, NY.
- Krueger, D.M., **Rutherford, E.S.**, and Mason, D.M. Predation as a mediator of Chinook salmon recruitment success in a large Lake Michigan tributary. 2006 Annual Meeting of American Fisheries Society, Lake Placid, NY.
- Kimura, M, **E.S. Rutherford**, S. Ludsin, J. Tyson, E. Roseman, and D. Mason. Does bioenergetic growth potential predict recruitment potential of yellow perch larvae in Lake Erie. 2006 Annual Meeting of American Fisheries Society, Lake Placid, NY.
- Tyler, J.A., M.J. Wiley, **E.S. Rutherford**, and C.M. Riseng. Modeling flow-dependent fish habitat in the Lower Muskegon River: Linking hydrologic models with and individual-based model for steelhead. 2006 Annual Meeting of American Fisheries Society, Lake Placid, NY.



Geddes, C.A., **E.S. Rutherford** and M. Kimura. Development of a GIS for Great Lakes Aquatic Habitats. 2006 Annual Meeting of the American Fisheries Society, Lake Placid, NY.

Breck, J.R., **E.S. Rutherford**, D.R. Swank, B. Low and C.P. Simon. Modeling the influence of stream growth on steelhead life history variation in the Great Lakes. 2006 Annual Meeting of the American Fisheries Society, Lake Placid, NY.

Swank, D.R., J.R. Breck, **E.S. Rutherford**, C.P. Simon and B. Low. Modeling life histories of Great Lakes and West Coast Steelhead populations. Annual Meeting of the American Fisheries Society, Lake Placid, NY.

2005:

Krueger, D.M., **Rutherford, E.S.**, and Mason, D.M. Predation as a mediator of smolt recruitment success in a large Great Lakes tributary. American Fisheries Society Annual Meeting, Sept. 2005, Anchorage, AL.

Marshall, E.R., **Rutherford, E.S.**, Creque, S.M., and Swank, D.R. Use of Landscape-scale models to estimate recruitment of steelhead and Chinook salmon to Lake Michigan fisheries. American Fisheries Society Annual Meeting, Sept. 2005, Anchorage, AL.

Tyler, J.A., Wiley, M.J., Riseng, C.M, and **Rutherford, E.S.** Modeling flow-dependent fish habitat in the Lower Muskegon River: Linking hydrologic models with an individual-based model for steelhead. Conference on Modeling trout and salmon habitat, CA. 2005 Conference on Natural Resource Modeling, Arcata, CA.

**Rutherford, E.S.** Natural reproduction and recruitment of Chinook salmon in Lake Michigan tributaries. Presented to Michigan DNR and Michigan United Conservation Corps, Lansing, MI. November 2005

**Rutherford, E.S.** Status and Trends in Inventory and Classification of Lake Michigan's Coastal Fisheries Habitats, presented at State of the Lake Michigan Biennial Conference, Lake Michigan, Green Bay, WI, November 2005.

**Rutherford, E.S.** Research on food web disruption in Great Lakes Ecosystems. Presented Dec. 2005 at USGS-Great Lakes Science Center.

David, S. R., and **Rutherford, E.S.** Ecological Factors affecting Fish Communities in the Lower Muskegon River, Michigan. Presented to IAGLR meeting Ann Arbor, MI..

Marko, K., , **Rutherford, E.S.**, Eadie, B., Lansing, M. A Stable Isotope Analysis of Food Webs Supporting Fisheries in the Muskegon River Estuary System. Presented to IAGLR meeting Ann Arbor, MI..

Hook, TO, **Rutherford, E.S.**, Beletsky, D., McCormick, M.J., Mason, D.M. Transport of fish larvae measured by drifter release experiments in Southern Lake Michigan, 2001-2002. Presented to IAGLR meeting Ann Arbor, MI..

Ivan, L. and **Rutherford, E.S.** Modeling the ecological effects of adfluvial fishes on a Lake Michigan tributary. Presented to IAGLR meeting Ann Arbor, MI..

Krueger, D., **Rutherford, E.S.**, and Mason, D.M. Factors influencing outmigration success of Chinook salmon in the Muskegon River. Presented to IAGLR meeting, Ann Arbor, MI..

Swank, D.R., and **Rutherford, E.S.** Temporal Variation in Life History Variation of Great Lakes Steelhead. Presented to IAGLR meeting, Ann Arbor, MI..

Beletsky, D., Schwab, D.J., **Rutherford, E.S.**, Mason, D.M. and Janssen, J. A coupled physical biological model of yellow perch recruitment in Lake Michigan. Presented to IAGLR meeting, Ann Arbor, MI..

Adlerstein, S. and **Rutherford, E.S.** Analysis of Lake Trout movements in Lake Huron inferred from tag recoveries and angler catch rates. Presented to IAGLR meeting, Ann Arbor, MI..

#### **Sessions organized at Scientific Conferences or Workshops:**

- I helped organize a coastal conservation workshop at IAGLR, 2008 at Trent University.
- I co-chaired a workshop on “Adaptations to Climate Change” at the national conference “Adapting to Climate Change” May 2007, Ann Arbor MI.
- I co-chaired a session on “Anthropogenic Effects on Great Lakes Aquatic Food Webs” at the 48<sup>th</sup> Annual Meeting of the International Association for Great Lakes Research, 2005, in Ann Arbor, MI
- I co-chaired a session on “Physical-Biological Coupling in Large Lakes” at the 48<sup>th</sup> Annual Meeting of the International Association for Great Lakes Research, 2005, in Ann Arbor, MI.
- I helped organize the 48<sup>th</sup> Annual Meeting of the International Association for Great Lakes Research, 2005, in Ann Arbor, MI.
- I chaired the organizing committee, and ran the 22<sup>nd</sup> Annual Meeting of the Early Life History Section of American Fisheries Society, 1998, Ann Arbor, MI..
- I co-chaired a session on “Advances in otolith technology” at the 22<sup>nd</sup> Annual meeting of the Early Life History Section of the Early Life History Section of American Fisheries Society, 1998, Ann Arbor MI.

#### **Teaching**

Fisheries Conservation and Management (NRE 639\_066) W’ 08).

Fish Ecology (NRE/ENVIRON 409) W’ 00-04.

Fisheries Science (NRE 460) F’ 95, 97, 99, 01, 03

River Restoration Seminar (co-taught with Michael Moore NRE 609) W’ 01

#### **Graduate Advisees**

*Past Graduate Students:* Tomas Höök, Larissa Sano, Aaron Woldt, David Swank, Brian Brenton, Brad Horne, Sara Creque, Neal Godby, Darryl Hondorp, Hui-Yu Wang,

Thomas Neeson, Sarah Zorn, Michelle DePhilip, Matthew Diana, Christine Diana, Dana Infante, Brian McCrae, Larissa Sano, Hideaki Sano, Brian Lantry, Meredith Bartron, David Halsing.

*Current graduate students:* Brad Utrup, Solomon David, Katharine Marko, Lori Ivan, Angela Giuliano, Damon Krueger, Hui-Yu Wang, James Roberts (University of Michigan)

*Masters or Ph.D Research Investigators/Postdocs:* Tomas Höök, Donna Kashian, Carlo DeMarchi, Christine Geddes, Minako Kimura, Shannon Brines

### **Research Grants:**

#### ***Pending:***

1. *GL08: A Regional Ecosystem Forecasting Model to Support Adaptive Management of the Laurentian Great Lakes in a Dreissenid-Dominated World*, requested \$4,827,000 from NOAA CSCOR, **E.S. Rutherford (co-PI)** with H. Vanderploeg (P.I. NOAA GLERL), J. DePinto (P.I. Limnotech), and 11 others.
2. *Forecasting spread and bioeconomic impacts of aquatic invasive species from multiple pathways to improve management and policy in the Great Lakes*, requested \$4,949,000 from NOAA CSCOR. **E.S. Rutherford (P.I.)**, David Lodge (Univ. Notre Dame) and 7 others.
3. Transition of BioSonics DT-X Fisheries Acoustics Sensor to Routine Real-time Operations Requested \$433,573 from NOAA's National Ocean Partnership Program. **E.S. Rutherford (P.I.)**, Steven Ruberg and Doran Mason (NOAA), Asa Packer and Jim Dawson (Biosonics Inc), Ji He (MDNR). April 2008-Nov 2010.
4. Spawning Habitat Suitability of Lake Sturgeon in Lake Huron Tributaries. Requested \$64,100 from US Fish and Wildlife Service. **E.S. Rutherford (P.I.)**, C. Geddes (University of Michigan), J. Johnson and R. Haas (Michigan Department of Natural Resources), J. Boase (National Fish and Wildlife Federation). Oct. 2008 – Sept. 2009.
5. Reproductive and Recruitment Success of Walleye in the Muskegon River. Requested \$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.
6. Poor quality of spawning habitat: a serious impediment to Cisco rehabilitation in the Great Lakes? Requested \$74,601 from Great Lakes Restoration Act. **E.S. Rutherford (PI)**, C. Madenjian (USGS Great Lakes Science Center, co-PI). June 2008 – Aug 2010.

#### ***Current:***

1. *Development of GIS – based decision support system for evaluation of lake-bed alterations.* \$29,984 from Michigan Dept. Environ. Quality. E.S. Rutherford (P.I.) with C.A. Geddes. Jan-.Dec.2008.
2. *Development of a GIS for inventory, classification and management of non-game wildlife in Great Lakes waters.* Michigan DNR, \$390,000, Oct 1 2006- Sept 30, 2010. E.S. Rutherford (P.I.)
3. *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.
4. *Quantitative tools to predict sea lamprey production based on habitat: prioritizing dam removal and contrl 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.
5. *Classification and Analysis of Great Lakes Fisheries Habitats.* \$537,240, 2003-2008. MDNR Fisheries Division. **E.S. Rutherford (P.I.)**
6. *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.
7. *ECOFOR 2006): Assessing the causes, consequences and remedies for hypoxia in Lake Erie.* \$2,200,000. **ES Rutherford (co-PI)**, Donald Scavia (PI, UM) and several others.

**Past:**

8. *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.
9. *A GIS for Lake Erie Aquatic Habitats.* \$142,000. From USFWS and Great Lakes Fisheries Commission. 2004-2005. **E.S. Rutherford (P.I.)**, R.C. Haas, and C.A. Geddes.
10. *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.)**.
11. *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.

12. *Development of Environmental Objectives for Lake Michigan*. \$60,000 from Great Lakes Fishery Commission. **E.S. Rutherford (P.I.)**
13. *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.
14. *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)..
15. *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)**.
16. *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).
17. *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).
18. *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)**.
19. *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).
20. *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).
21. *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)

22. *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).**
23. *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).
24. *Ecological and Economic Impacts of Watershed Restoration on Salmonid Productivity in Lake Michigan Tributaries.* \$106,455, funded by Michigan Sea Grant. 3/1/7 – 2/28/99.. **E.S. Rutherford (Co-P.I.),** with M. Moore (PI, UM-SNRE), J. Hoehn and F. Lupi (Michigan State University).
25. *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).
26. *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).
27. *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).**
28. *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.**
29. *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).