

4/30/20

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Education

Ph.D. (Oceanography and Limnology) University of Wisconsin-Madison 1999
M.S. (Oceanography and Limnology) University of Wisconsin-Madison 1995
B.S. (Biology) University of Wisconsin-Stevens Point 1993

Faculty Employment

2012-present Professor, Biology, Integrated Biosciences, Water Resources Science
2016-2019 Department Head, Biology, University of Minnesota, Duluth
2008, 2014-16 Associate Department Head, Biology, University of Minnesota, Duluth
2009-2013 Associate Director of Graduate Studies, Ecology Track, Integrated Biosciences Program
2006- 2012 Associate Professor, Biology, University of Minnesota, Duluth
2001- 2006 Assistant Professor, Biology, University of Minnesota, Duluth
2002-Present Adjunct Professor, Large Lakes Observatory

Research Experience

1999-2000 Research Associate, NTL-LTER, University of Wisconsin-Madison
1998 Project Assistant, NTL-LTER, University of Wisconsin-Madison
1993-1998 Research Assistant, NTL-LTER, University of Wisconsin-Madison

Fellowships & Awards

2019-20 *University of Minnesota, One-year sabbatical leave for research*
2015 *Scientific and Technological Achievement Award, Level III, US-EPA.*
2011 *Award for excellence in the arts and sciences, St. Louis Co., MN*
2010-11 *University of Minnesota, One-year sabbatical leave for research*
2004 *University of Minnesota, Single Semester Leave for Research*
1997-1999 *Graduate Research Traineeship (GRT-NSF) for the integration of Lake and Stream Ecology*
1993-1996 *Advanced Opportunity Fellowship, University of Wisconsin-Madison Graduate School (3 consecutive awards)*
1994, 1995 *Anna Grant Birge Scholarship for Limnological Research, Center for Limnology, University of Wisconsin-Madison (2 consecutive awards)*

External Reviewing, Editorial and Professional Activities

Participated as Reviewer for: Aquatic Ecosystem Health and Management, Biological Conservation, Canadian Journal of Fisheries and Aquatic Science, Ecology, Journal of Plankton Research, Hydrobiologia, Journal of Great Lakes Research, Fisheries, Transactions of the American Fisheries

Society, Landscape Ecology, Ecological Modeling, the Marine Ecology Progress Series, Oikos, Limnology and Oceanography, Food webs, Wetlands, North American Journal of Fisheries Management, Ecosystems, Bulletin of Marine Science, PLOS ONE, and River Research and Applications. Also, reviewed research proposals for the National Science Foundation, Michigan Sea Grant, New York Sea Grant, National Sea Grant, Great Lakes Fishery Commission and the National Marine Fisheries Service.

Panels:

NSF Panelist for Population and Community Ecology (DEB) fall 2011

Panel Member – Blue Ribbon Panel, Department of Interior, National Park Service, Review of Isle Royal Research Program, 2008

Editorial Board: Journal of Great Lakes Research (Elsevier) (2003-2016), Food Webs (Elsevier) (2014-present)

Board of Trustees: The Nature Conservancy, Wisconsin Chapter (2019-present)

Memberships: International Association for Great Lakes Research, American Fisheries Society

2009 Member at large, Executive Committee, Minnesota Chapter of the American Fisheries Society

2011 President elect – Minnesota chapter of American Fisheries Society, member of Executive Committee

2012 President: 2012. Minnesota Chapter of the American Fisheries Society, Chair of the Executive Committee

2013 Past President – Minnesota chapter of the American Fisheries Society, member of the Executive Committee.

Chair of the issues and resolutions committee, Chair of the Nominations Committee, MN AFS

Symposia and Meeting Activities

2015-2018, member of the organizing committee for the 9th International Charr Symposium

2012 Participated in steering committee as President for the American Fisheries Society Annual Meeting in Minneapolis.

2012 Co-Chaired a symposium session at the American Fisheries Society Annual Meeting in Minneapolis entitled “Diel vertical migration: scaling down from populations to individuals”

2011 Co-Chaired symposium session at the International Association for Great Lakes Research conference entitled “Restoration of native fish communities in Great Lakes ecosystems”

2010 Co-Chaired symposium session at the International Association for Great Lakes Research conference entitled “Fish Communities, Habitat Coupling and Energy Transfer in Great Lakes Ecosystems”

Teaching Experience (teaching load is 3-5 A-F courses per year)

*University of Minnesota-Duluth**

Ecology Laboratory, Biology 2802, University of Minnesota- Duluth, 2008- 2009

Ecological Processes, IBS 8201, University of Minnesota-Duluth, 2006-2017

Fisheries Ecology, Biology 5805, UM-Duluth, 2001-2015
 Ichthyology, Biology 4761, University of Minnesota-Duluth, 2001-present
 Biology Seminar-I, Biology 3997, University of Minnesota-Duluth, 2001-2007
 Communications in Biology 3987, University of Minnesota – Duluth, 2009-2014
 Biology Seminar II, Biology 3998, University of Minnesota-Duluth, 2002, 2005, 2008
 General Biology, Biology 1011, University of Minnesota-Duluth, 2002-2006
 Freshwater Ecology, Biology 3835, University of Minnesota-Duluth, 2013-present
 Stream Ecology, Biology 5833, University of Minnesota-Duluth, 2020- present
 Ecology, Biology 2801, University of Minnesota-Duluth, 2020-present
 * My teaching and advising load at UMD in a normal year includes three upper division A-F courses (one with a lab), advising two undergraduate researchers, advising three graduate students and assigned formal advising of ~32 undergraduate students.

Graduate Student Mentoring

Served as Advisor or Co-Advisor of 24 (4 Ph.D. and 20 M.S.) students completed or current from 2003-present. Students took an average of 2.2years to completion for M.S., 4.5 years to completion for Ph.D.

Past Students

2001-2003 **Damon Krueger** (M.S., Biology, UMD) (Primary Advisor),
 2001-2003 **Hazel Richmond** (M.S., Biology, UMD) (Co-adviser with A. Mensinger)
 2002-2004 **John Schwalbe** (M.S., Biology, UMD) (Primary Advisor)
 2002-2004 **Bradley Ray** (M.S., Biology, UMD) (Primary Advisor)
 2003-2006 **Beth Holbrook** (M.S., Biology, UMD) (Primary Advisor).
 2004-2007 **Trent Liebich** (M.S., Biology) (Primary Advisor).
 2007- 2009 **Tyler Ahrenstorff** (M.S., Integrated Biosciences)(Primary Advisor).
 2007- 2009 **Josh Dumke** (M.S., Integrated Biosciences)(co- Advisor w/Val Brady).
 2007- 2010 **Edmund Issac** (M.S., Water Resources Science)(Primary Advisor).
 2004-2010 **Allison Gamble** (Ph.D., Water Resources Science) (Primary Advisor) .
 2006- 2010 **Beth Holbrook** (Ph.D., Water Resources Science) (co-Advisorw/Branstrator).
 2010- 2012 **Tyler Kasper** (M.S., Integrated Biosciences) (Primary Advisor).
 2010-2012 **Samantha Oliver** (M.S., Integrated Biosciences) (co-Advisor w/Branstrator).
 2009- 2013 **Tyler Ahrenstorff** (Ph.D., Integrated Biosciences) (Primary Advisor).
 2011-2014 **Kirk Olson** (MS, Integrated Biosciences (Primary Advisor)
 2012- 2015 **Trevor Keyler** (M.S., Integrated Biosciences) (co-Advisor w/Mensinger).
 2013 – 2015 **Emily Heald** (M.S., Integrated Biosciences) (Primary Advisor)
 2014-2016 **Matt Pawlowski** (M.S., Integrated Biosciences)(co-Advisor w/Branstrator)
 2014 – 2016 **Ian Harding** (M.S., Integrated Biosciences) (co-Advisor w/Branstrator)
 2015- 2018 **Trevor Keyler** (Ph.D., Integrated Biosciences) (Primary Advisor)
 2016-2018 **Jamie Dobosenski** (M.S., Integrated Biosciences)(Primary Advisor)
 2016-2019 **Bradley Dawson** (M.S., Integrated Biosciences)(co-Advisor w/Hoffman)
 2016-2019 **Ryan Grow** (M.S., Integrated Biosciences)(Primary Advisor)
 2017- 2020 **Noland Michels** (M.S., Integrated Biosciences) (co-Advisor w/Mensinger)

Current Graduate Students

2018- **Quinnlan Smith**, (M.S. Integrated Biosciences) (co-Advisor w/Sass)
 2020- **Danny McCann**, (M.S. Integrated Biosciences) (Primary Advisor)

2020- **Noland Michels**, (Ph.D. Integrated Biosciences) (co-Advisor w/Mensing)

Graduate Committee Member

2001-2003 Lucy Palmer, MS UMD Biology.
2001-2004 Mike Calahan, MS UMD Biology.
2001-2002 Meghan Smith, MS WRS program.
2002-2005 Meghan Smith, Ph.D. WRS program.
2003-2005 John Sandberg, MS UMD Biology.
2004-2007 Margot Bergstrom, MS UMD Biology.
2004-2006 Adam Deweese, MS WRS program.
2005-2006 Malia Lahr, MS UMD Biology.
2007-2010 Mike Lynch, MS UMD IBS program.
2007-2010 Jami Johnson, MS UMD IBS program.
2007-2009 Tory Olson, MS UMD IBS program.
2009-2014 Jennifer Olker, Ph.D. UMD IBS program.
2010-2016 Brook Vetter, Ph.D. UMD IBS program
2011-2016 Grace Loppnow, Ph.D. UMTC Conservation Biology
2011-2014 Kelly Harrington, MS UMD IBS Program
2012-2014 Zach Lawson, MS UW-Madison, Zoology
2012-2016 Sarah Kadlec, Ph.D. UMD IBS program
2014-2016 Kelsey Murchy MS UMD IBS program
2014-2016 Emily Cardinal, MS UMD IBS program
2014- Jonathan Utecht, MS UMD IBS program
2016-18 Hanna Ramage, MS UMD IBS program
2013-17 Michelle Gutsch, PhD UMD IBS program
2017- Lorenzie Rogers, MS UMD IBS program
2017-2018 Andrew Nisson, MS UMD IBS program
2018- Kirill Shchapov, PhD UMD WRS program
2019 Kyle Stratton, Lakehead University, Thunder Bay, ON, Biology program

Service (at University of Minnesota Duluth)

Department of Biology Committees

2001-2002 Biology Seminar Committee (chair)
2002-2003 Biology Seminar Committee (chair), Social Committee (chair)
2003-2004 Biology Curriculum Committee, Library Representative for Biology Dept.
2004-2005 Biology Curriculum Committee, Library Representative for Biology Dept.
2005-2006 Biology Curriculum Committee, Biology Awards Committee (chair)
2006-2007 Biology Petition and Course Equivalency Committee (chair)
2006-2007 Biology freshman course evaluation committee
2007-2008 Biology Petition and Course Equivalency Committee
2007-2008 Biology Seminar Committee (chair)
2008-2009 Associate Professor/Tenure Criteria Committee (chair)
2009-2010 Biology Petition and Course Equivalency Committee (co-chair)
2011-2012 Biology Seminar Committee (chair)
2012-2013 Safety committee (chair)
2014-2015 Biology Seminar Committee (chair)
2008, 2014-2016, Associate Department Head
2014-15 Chair, Search Committee for Instructors (4) in Biology

2015-16 Chair, search committee for Senior Office/Administrative Supervisor, Biology
 2015-16 Chair, search committee for biology instructor (2)
 2015-16 Chair, search committee Greenhouse Technician
 2015-16 ICR committee member
 2016- Executive Committee Biology
 2016- Executive Committee – IBS program
 2016-2019 Department Head

Other Committees

2003-2004 Member of Search Committee for Large Lakes Observatory Director
 2004-2005 Member of Water Resource Science Curriculum Committee
 2005-2006 Member of Search Committee for Biology Department Microbial Geneticist
 2005-2006 Member of Search Committee for Biology Department Plant Biologist
 2005-2006 Member of Search Committee for Director, Minnesota Sea Grant College Program
 2005-2006. College of Science and Engineering - semester leave screening committee
 2006-2009 Integrated Biosciences Admissions Committee
 2008-2009 Member of Search Committee for Biology Department Plant Physiologist
 2009-2010 Member of Search Committee for the Director of the Natural Resources Research Institute, Center for Water and the Environment

 2009-13 Integrated Biosciences Director of Graduate Studies EOP track
 2011-12 Member of Search Committee for Biology Department Geneticist.
 2012-13 Member of Search Committee for Large Lakes Observatory/Biology joint positions (3)
 2013-14 Member of Search Committee for Large Lakes Observatory/Biology joint position(1)
 2013-14 Member of Search Committee for the Dean of Swenson College of Letters and Sciences
 2014-15 Member UROP review committee, SCSE
 2014-15 College of Science and Engineering - semester leave screening committee
 2014-15 Member UROP review committee, SCSE
 2016-present Senior Academic Leadership committee, SCSE
 2018-19 Member UROP review committee, SCSE

Other Activities

2003 Visiting Assistant Professor—University of Wisconsin-Madison (Summer 2003, Summer- Fall 2004, w/J.F. Kitchell).
 2018-19 Visiting Professor --- University of Wisconsin-Madison (Summer 2018, 2019 w/Emily Stanley).

Research Grants and Contracts

Lead Principal Investigator

2019-2020. *Wisconsin Department of Natural Resources*. Fish Habitat Use, Production and Food Web Responses to Additions of Lake Coarse Woody Habitat. Direct: \$34,025. Total: \$39,244.

 2017-2020. *United States Fish and Wildlife Service*. Assessing the Status of Cisco in Lake Superior. \$83,091 direct, \$94,970 total.

 2016-2017. *Wisconsin Department of Natural Resources*. Optimal Walleye Foraging and Survival: The Effects of Light, Temperature, Water Clarity, and Habitat Complexity. Direct: \$27,146, Total: \$31,218.

2012-2015. *Minnesota Sea Grant College Program, Lead PI with co-PI's A. Mensinger, B. Roth and O.Gorman.* [Funded] Foraging mechanisms and interactions between siscowet, kiyi and deepwater sculpin: forecasting change in the Lake Superior food web. Direct: \$30,695, Graduate Assistantship \$78,000, Total Funding \$ 108,695.

2009-2012. *Legislative-Citizen Commission on Minnesota Resources.* Cisco assessment, habitat use and behavior.-sub proposal within - Sustaining Lakes In a Changing Environment (SLICE), \$100,000 direct of 825,000 total.

2007-2010. *Bradley Fund for the Environment, Sand County Foundation.* The effect of low oxygen concentration as a disturbance event influencing the composition and size distribution of a fish community. \$37,000 in direct costs

2007-2009. *Wisconsin Department of Natural Resources.* Evaluation of Channel Morphology Change and Biotic Response to a Habitat Improvement Technique in a Wisconsin Lake Superior Tributary. Funding Categories: Direct costs: \$60,000

2007-2008. *Minnesota Department of Natural Resources.* Development of a lake herring population model for the Minnesota waters of Lake Superior. Funding Categories: \$5,000 direct costs.

2007-2008 *Minnesota Sea Grant.* Reaction distance and feeding characteristics of age-0 lake trout under light conditions found in Lake Superior. Funding Categories: \$6,500 Graduate Research Assistantship.

2007-2009. *Minnesota Sea Grant College Program, with co-PI J. Stockwell.* Diel vertical migration in the Lake Superior offshore fish community. Funding Categories: \$154,840 in direct costs, \$60,186 in Graduate Research Assistantships. Total Funding \$215,026

2003-2008. *Minnesota Department of Natural Resources.* Development of a hydroacoustic survey design for the assessment of pelagic prey fishes the Minnesota waters of Lake Superior. \$101,300 in direct costs.

2005-2007. *Minnesota Sea Grant College Program, with co-PI's J. Stockwell, D. Yule and O. Gorman.* Habitat supply and trophic transfer in Lake Superior. Funding Categories: \$53,000 in direct costs, \$57,186 in Graduate Research Assistantships. Total Funding \$110,180

2003-2005. *Ontario Ministry of Natural Resources.* Development of a lake-wide acoustic monitoring program for Lake Superior Pelagic fishes. \$80,000 in direct costs.

2003-2005. *Minnesota Sea Grant College Program, with PI's N.Watrus, D. Branstrator, E. Ralph, B. May, S. Stark, O. Gorman, and S. Schram.* Assessing determinants of lake trout reproductive success: comparison of Lake Superior reef complexes with contrasting survival rates of young lake trout. Funding Categories: \$70,000 in direct costs, \$48,837 in Graduate Research Assistantships. Total Funding \$118,837

2001-2003. *Bradley Fund for the Environment, Sand County Foundation*. Assessment of the restoration of winter-kill influenced fish community using winter aeration. \$27,900 in direct costs

2002-2004 *Great Lakes Fishery Commission-Coordination Activities Program*, with D. R. Schreiner, M. P. Ebener and M. H. Hoff . Compilation and analyses of Lake Superior salmonine diets: a multi-agency collaboration. \$46,134 in direct costs.

2001-2003. *Bradley Fund for the Environment, Sand County Foundation*, Mitigating the negative effects of smelt on lake herring in small lakes. \$25,612 in direct costs.

Co-Principal Investigator

2019-2021. *Legislative-Citizen Commission on Minnesota Resources*. Schreiner, K., L. Minor-Austin, T.R. Hrabik, M. Kitson. A Survey of Microplastics in Minnesota's Inland Aquatic Food Webs. \$200,000

2014-2016. *Legislative-Citizen Commission on Minnesota Resources*. Brown, E., S. Coleman, J. Austin, D. Ricketts, T. Hrabik, E. Minor, D. Branstrator. Evaluating Lake Superior's Health and Biological Productivity. \$600,000.

2013-2015. *Wisconsin Department of Natural Resources*. PI J. Vander Zanden, co-PI's S.R. Carpenter, T.K. Kratz and T.R. Hrabik. Whole-Lake Mixing to Remove Invasive Rainbow Smelt in Crystal Lake WI. \$147,028.

2013-2014. *Great Lakes Fishery Commission, science transfer program*. PI-D. Warner, co-PI J. Adams, D. Yule, T. Hrabik, , R. Claramont. Using a simulated fish community to evaluate the importance of catchability on abundance estimates for acoustic surveys. \$15,750.

2013-2015. *Great Lakes Fishery Commission, pilot project program*. O. Gorman, T. Hrabik, C. Bronte, S. Sitar. A hyperbaric holding and transport vessel for collection of deepwater fishes for research and broodstock development. \$10,000.

2012-2014. *Minnesota Sea Grant College Program, Co-PI with L. Minor, J. Werne, D. Branstrator*. [Funded] What feeds Lake Superior food webs? A multi-isotope investigation. Direct: \$48,730, \$37,500 Shiptime, 78,000 Graduate Assistantship. Total Funding \$164,230.

2010-2012. *Minnesota Sea Grant College Program*, PI's S. Guildford, T. Hrabik, D. Branstrator and B. Hecky. Feeding the deep: interdependencies between the vertically migrating deep water fauna and the deep chlorophyll layer in Lake Superior. \$94,287 direct, approximately 120,000 in Graduate Research Assistantships. Total Funding \$214,287

2005-2010. *Great Lakes Fishery Commission, Fishery Research Program, PI's J. Stockwell, T.R. Hrabik, O. Johannssen, C. P. Madenjian M. Sierszen*. Evaluation of Mysis relicta as a keystone species for native fish communities of the Great Lakes. Total Funding \$94,221.60

2005-2008. *Minnesota Sea Grant College Program, PI's D. Branstrator, B. May and T.R. Hrabik.* Mesoscale eddies and the distribution of biological productivity in Lake Superior. Funding Categories: \$33,544 in direct costs, \$60,000 in ship time, \$57,186 in Graduate Research Assistantships. Total Funding \$150,730

2003. *National Science Foundation, Oceanographic Instrumentation- Midwater trawl and mensuration equipment, R/V Blue Heron.* Co-PI with R. D. Ricketts and N. Wattrus. \$45,612 in equipment costs.

2008. *National Geographic Society Waitt Grant* – research cruise on Lake Hovsgol, Mongolia. Project title: “Can climate and land-use change drive biotic homogenization of fish communities in a large, pristine, oligotrophic lake?” Olaf Jensen (Co-PIs: Sudeep Chandra, Bud Mendee, David Gilroy, Tom Hrabik) \$15,000

Collaborator

2002-present. Faculty Associate Member and collaborator, North Temperate Lakes-Long-Term Ecological Research Project-NSF. (approx. 7.7K /year)

2001-2004. *EPA-Starr Grant-Great Lakes Environmental Indicators, Fish and Invertebrate Sub-Project.* Collaborator with PI L. Johnson and G. Niemi. \$894,000 of \$6,000,000.

2003-2008. *The International Finance Corporation (World Bank).* PI's J. Vander Zanden, S. Chandra and collaborators J. Kitchell, E. Stanley, D. Gilroy, P. Moyle, Z. Hogan, B. Allen, T. R. Hrabik, M. Erdenebat, A. Brunello. Development of a research program on the ecology and management of *Hucho taimen* in the Eg-Uur and surrounding watersheds (Mongolia). \$250K. 2003-2008.

2010-2014 *National Science Foundation* – Project title: “Climate change and threatened 2011-2013 salmonid fishes in Northern Mongolia” (Co-PI: Tim Zimmerman, 11 collaborators including Hrabik) \$149,988

Publications (*indicates graduate advisee)

2020

Dawson, B., G. Peterson, T.R. Hrabik and J. Hoffman. Dietary Niche and Growth Rate of the Nonnative Tubenose Goby (*Proterorhinus semilunaris*) in the Lake Superior Basin. In review. *J. Great Lakes Res.*

T.R. Hrabik, Harding, I.C.*, D.K. Branstrator and B.A. Ray. Retrospective Analyses of Growth and Predatory Demand of Cisco (*Coregonus artedii*) in Western Lake Superior. In revision. *J. Great Lakes Res.*

Dobosenski, J, W. Larson, J. Stasburg, T.R. Hrabik. Variable invasion dynamics of rainbow smelt create complex genetic structure across the Great Lakes Region. *J. Great Lakes. Res.* 46:382-390.

Grow, R., T.R. Hrabik, D. Yule, B. Matthias, J. Myers, C. Abel. Comparison of down-looking to multi-directional acoustic density estimates of pelagic fishes in Lake Superior. In review. *J. Great Lakes Res.*

Matthias, B., T. R. Hrabik, J. Hoffman, M. Seider, M. Sierszen, M. Vinson, D. Yule and P. Yurista. Trophic transfer efficiency in the Lake Superior food web: assessing the impacts of non-native species. In review. J. Great Lakes Res.

2019

Keyler, T.D.*, B. Matthias, **T.R. Hrabik**. 2019. Siscowet lake charr (*Salvelinus namaycush siscowet*) visual foraging habitat in relation to daily and seasonal light cycles. Hydrobiologia 840:77-88.

Keyler, T.D.*, **T.R. Hrabik**, et al. 2019. Effect of Light Intensity and Substrate Type on Siscowet Lake Trout (*Salvelinus namaycush siscowet*) Predation on Deepwater Sculpin (*Myoxocephalus thompsonii*). Hydrobiologia 840: 63-76.

Sass, G.G., S.L. Shaw, T. P. Rooney, A. L. Rypel, J. K. Raabe, Q. Smith, **T. R. Hrabik**, and S. Toshner. 2019. Coarse woody habitat and inland lake fisheries: knowns, unknowns, and key uncertainties. Lake and Reservoir Management 35:382-395. <https://doi.org/10.1080/10402381.2019.1630530>

Olson, K.W.* T. Krabbenhoft, **T.R. Hrabik**, B. Mendsaikhan and O.P. Jensen. 2019. Pelagic-littoral trophic polymorphism in Hovsgol grayling *Thymallus nigrescens* from Lake Hovsgol, Mongolia. Ecol. Freshw. Fish. 28:411-423. DOI: 10.1111/eff.12464

2018

Pawlowski, M.B.*, D.K. Branstrator, **T.R. Hrabik**. 2018. Major shift in the phenology of crustacean biomass in Western Lake Superior associated with temperature anomaly. J. Great Lakes Res. 44:788-797.

2017

Pawlowski, M.B.*, D. K. Branstrator, **T.R. Hrabik**, R. Sterner. 2017. Changes in the cladoceran community of Lake Superior and the role of *Bythotrephes*. J. Great Lakes Res. 43: 1101-1110

Heald, E.*, **T.R. Hrabik**, L. Yang, Z. Lawson, S.R. Carpenter, M.J. Vanderzanden. 2017. The Effects of Experimental Whole-Lake Mixing on Horizontal Spatial Patterns of Fish and Zooplankton. Aquat. Sci. 79: 543-556.

2016

Ahrenstorff, T.D.* and **T.R. Hrabik**. 2016. The mechanisms driving seasonal changes in partial, reverse diel vertical migrations of cisco (*Coregonus artedii*). J. Fish Biol. 89:1794-1809.

Kruger, B.R., Werne, J.P., Branstrator, D.K., **Hrabik, T.R.**, Chikaraishi, Y., Ohkouchi, N., Minor, E.C., 2016. Organic Matter Transfer in Lake Superior's Food Web: Insights from Bulk and Molecular Stable Isotope and Radiocarbon Analyses. Limnology and Oceanography 61 (1), 149-164

Olson, K.*, O.P. Jensen and **T.R. Hrabik**. 2016. Feeding ecology and prey resource partitioning of lenok (*Brachymystax lenok*) and Baikal grayling (*Thymallus arcticus baicalensis*) in the Eg and Uur Rivers, Mongolia. Ecology of Freshwater Fish. doi: 10.1111/eff.12234

2015

- Keyler, T.D.*, **T.R. Hrabik**, and A. Mensinger. 2015. Foraging mechanisms of siscowet (*Salvelinus namaycush* siscowet) on pelagic prey. *Journal of Great Lakes Research*. 41:1162-70.
- Lawson, Z.J., J.M. Vander Zanden, C. Smith, E. Heald*, **T.R. Hrabik** and S.R. Carpenter. 2015. A test of thermal limits: experimental mixing of Crystal Lake, WI to eradicate cold water invasive smelt. *Can. J. Fish. Aquat. Sci.* 72:926-937.
- Harrington, K.A.*, **T.R. Hrabik** and A.Mensinger. 2015. Visual sensitivity of deep water Lake Superior fishes. *Plos one*. 10: e0116173
- Meyers J., D.L. Yule, M.L. Jones, T.D. Ahrenstorff, **T.R. Hrabik**, R.M. Claramunt, M.P. Ebener; E.K. Berglund. 2015. Spatial synchrony in cisco recruitment. *Fisheries Research*. 165:11-21.
- Gaeta, J., **T. R. Hrabik**, G.G. Sass, B.M. Roth, G. Hansen, S. Gilbert and J. Vander Zanden. 2015. Dynamics of rainbow smelt under altered predation and fishing mortality. *Hydrobiologia* 746:433-444.

2014

- Hrabik, T.R.**, B.M. Roth and T.D. Ahrenstorff. 2014. Predation risk and prey fish vertical migration in Lake Superior: insights from an individual based model of siscowet (*Salvelinus namaycush*). *Journal of Great Lakes Research* 40:730-738.
- Sierszen, M.J. **T.R. Hrabik**, J.D. Stockwell, D.L Yule, L. Evrard, A.E. Gamble. 2014. Depth gradients in food web processes linking large lake habitats: Lake Superior as an exemplar ecosystem. *Freshwater Biology* 59:2122-36.
- Yurista, P., M. Balge, J. VanAlstine, **T.R. Hrabik**, A. Gamble, D. Yule, J. Stockwell, J. Kelly. 2014. A new look at the Lake Superior biomass size-spectrum. *Can. J. Fish. Aquat. Sci.* 71:1324-1333.
- Stockwell, J.D., D.L. Yule, **T.R. Hrabik**, M.E. Sierszen and E.J. Issac. 2014. Habitat coupling in a large lake system: delivery of an energy subsidy by an offshore planktivore to the nearshore zone of Lake Superior. *Freshwater Biology*. 59:1197-1212. DOI:10.1111/fwb.12340
- Janssen, J., J.E. Marsden, **T. R. Hrabik** and J.D. Stockwell. 2014. Are the Laurentian Great Lakes Great Enough for Hjort? *ICES J. Mar. Sci.* DOI: 10.1093/icesjms/fst220
- Oliver, S.K.*, D.B. Branstrator, **T.R. Hrabik**, S. Guildford, R. Hecky. 2014. Zooplankton nutrient recycling in the deep chlorophyll layer of Lake Superior. *Can. J. Fish. Aquat. Sci.* 72:390-399. DOI: 10.1139/cjfas-2014-0209

2013

- Yule, D.L., J. Adams, D. Warner, **T.R. Hrabik**, B.Wiedel. 2013. Evaluating approaches for estimating biomass of pelagic fish species using simulated fish communities. *Can. J. Fish. Aquat. Sci.* 70:1845-1857. [d.x.doi.org/10.1139/cjfas-2013-0072](http://dx.doi.org/10.1139/cjfas-2013-0072).
- Ahrenstorff, T.D.*, **Hrabik, T.R.**, Jacobson, P.C., and Pereira, D.L. 2013. Food resource effects on diel movements and body size of cisco (*Coregonus artedii*) in north-temperate lakes. *Oecologia*. 173:1309-1320. DOI 10.1007/s00442-013-2719-3

Yule, D.L., J. Adams, **T.R. Hrabik**, J. Woiak, M. Vinson, T. Ahrenstorff. 2013. Use of Classification Trees to Apportion Acoustic Targets to Species: Application to the 2011 Lake-wide Acoustic and Midwater Trawl Survey of Lake Superior. *Fisheries Research* 140:123-132.

Holbrook B.V,* **T.R. Hrabik**, D.B. Branstrator and A. Mensinger. 2013. Foraging Mechanisms of Age-0 Lake Trout (*Salvelinus namaycush*). *Journal of Great Lakes Research*. 39:128–137

2012

Issac, E.J.*, **T.R. Hrabik**, J.D. Stockwell, A. E. Gamble and D.L. Yule. 2012. Prey selectivity in the Lake Superior Food Web. *Journal of Great Lakes Research*. 38:326-35

Warner, D.M., R.C. Claramunt, J.S. Schaeffer, **T. Hrabik**, B. Pientka, D. Yule, L. Rudstam, J.D. Holuszko and T.P. O'Brien. 2012. Relationship between mid-water trawling effort and catch composition variability in large lakes dominated by alosines, osmerids and coregonines. *Fisheries Research*. 123:62-69.

Ahrenstorff, T.D*., O.P. Jensen, B.C. Weidel, B. Mendsaikhan, and **T.R. Hrabik**. 2012. Abundance, spatial distribution, and diet of endangered Hovsgol grayling (*Thymallus nigrescens*). *Environmental Biology of Fishes*. DOI: 10.1007/s10641-011-9961-5.

Roth, B.M., N.E. Mandrak, J. Peters, **T. R. Hrabik** and G.G. Sass. 2012. Fish and decapod crustaceans of the Great Lakes basin. In *Great Lakes Policy and Management 2nd ed.* Edited by: W.T. Taylor and A. Lynch. Michigan State University Press.

2011

Gamble, A.E*., **T.R. Hrabik**, J.D. Stockwell, D.L. Yule. 2011. Trophic connections in Lake Superior I: the offshore foodweb. *Journal of Great Lakes Research* 37:541-549.

Gamble, A.E.* , **T.R. Hrabik**, J.D. Stockwell, D.L. Yule. 2011. Trophic connections in Lake Superior II: the nearshore foodweb and comparisons to the offshore foodweb. *Journal of Great Lakes Research* 37:550-560.

Ahrenstorff, T.D.* , **T.R. Hrabik**, J.D. Stockwell, D.L. Yule, and G.G. Sass. 2011. Seasonally dynamic diel vertical migrations of *Mysis diluviana*, coregonine fishes, and siscowet lake trout in the pelagia of Western Lake Superior. *Transactions of the American Fisheries Society* 140:1504-1520.

Liebich, T.A.* , S.D. McCormick, D. Kircheis, K. Johnson, R. Regal, **T.R. Hrabik**. 2011. Water chemistry and its impacts on the physiology and survival of Atlantic Salmon (*Salmo salar*) smolts in eastern Maine, USA. *J. Fish. Biol.* 72:502-519.

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Solomon, C.T., B.M. Roth, **T.R. Hrabik** and M.J. Vander Zanden. 2010. Comparing energetic and dynamic descriptions of food web linkages. *Oikos*. 120:194-199.

Roth, B. M., **T. R. Hrabik**, C. T. Solomon, N. Mercado-Silva, and J. F. Kitchell. 2010. A simulation of food web interactions leading to rainbow smelt (*Osmerus mordax*) dominance in Sparkling Lake, Wisconsin. *Journal of Fish Biology*. 77, 1379–1405

Dumke, J. D.*, **T. R. Hrabik**, V. J. Brady, K. B. Gran, R. R. Regal, M. J. Sieder. 2010. Channel morphology response to selective wood removals in a sand-laden Wisconsin trout stream. *North American Journal of Fisheries Management*. 30:776-790.

Stockwell, J.S., **Hrabik, T.R.**, O.P. Jensen, D.L. Yule, and M. Balge. 2010. Empirical evaluation of predator-driven diel vertical migration in Lake Superior. 67:473-485. *Can. J. Fish. Aquat. Sci.*

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Jensen, O.P. D.J. Gilroy, M.J. Vander Zanden, S. Chandra, Z. Hogan, B.C. Allen, **T.R. Hrabik**, B.C. Weidel. 2009. Evaluating alternative fisheries for taimen, *Hucho taimen*, in Mongolia. *Can. J. Fish. Aquat. Sci.* 66:1707-1718.

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2007

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Hrabik, T. R., J. J. Magnuson and A. S. McLain. 1998. Predicting effects of rainbow smelt (*Osmerus mordax*) on native fishes: evidence from long-term research on two lakes. *Canadian Journal of Fisheries and Aquatic Sciences* 55:1364-1371.

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Hrabik, T.R., D. Schreiner, M. Balge and S. Geving. 2006. Development of a hydroacoustic sampling design to quantify prey fish abundance in the Minnesota waters of Lake Superior. Minnesota Department of Natural Resources Investigational Report 530.

Schlesinger, W. H., V. Aneja, Department, F.S. Chapin, N. Comerford, J. P. Gibbs, **T.R. Hrabik**, P. Megonigal, M. Turner. 2009. Strategic Plan: Scientific Research at Isle Royale National Park. Panel Report. Department of Interior, National Park Service.

Yule, Daniel L., J.D. Stockwell, E.J. Isaac, A.E. Gamble, M.J. Seider, M.E. Sierszen, **T.R. Hrabik**, and O.T. Gorman. Nearshore and offshore ecological interactions. State of Lake Superior in 2012. Great Lakes Fishery Commission. Technical Report

Scientific Presentations and Published Abstracts (presenting author only)

Hrabik, T.R., Matthias, B., J.Hoffman, D. Yule, M.Vinson and M. Sieder. Impacts of fishery changes and food web stressors on the Lake Superior food web. The Nature Conservancy, Great Lakes Sustainable Fisheries Meeting. September 13, 2019. Duluth, MN.

Hrabik, T.R., Matthias, B., J. Hoffman, and M. Vinson. Characteristics of the Lake Superior Food Web. Cooperative Science and Monitoring Initiative Meeting. MED EPA lab. Duluth, MN June. 2019.

Keyler, T, **Hrabik, T.R.***, Rogers, L., Mensinger, A. and O. Gorman. Foraging mechanisms of siscowet lake trout on the benthic deepwater sculpin: the effect of light intensity and substrate type on predator-prey interactions. Duluth, MN. June 2018. [Abstract] In: 9th International Charr Symposium program.

Keyler, T, **Hrabik, T.R.***, Rogers, L., Mensinger, A. and O. Gorman. Foraging mechanisms of siscowet lake trout on the benthic deepwater sculpin: the effect of light intensity and substrate type on predator-prey

interactions. St. Cloud, MN. February 2018. [Abstract] In: Minnesota Chapter of the American Fisheries Society meeting program.

Hrabik T.R. and T.D. Ahrenstorff. 2017. The mechanisms driving seasonal changes in partial, reverse diel vertical migrations of cisco (*Coregonus artedii*). International Coregonid Symposium. Bayfield, WI. September 2017. [Abstract] In: 13th International Coregonid Symposium program.

Hrabik T. R., I.C. Harding, D.K. Branstrator, B. Ray, C. Goldsworthy. Retrospective analysis of growth and prey limitation of cisco in Western Lake Superior. Minnesota Chapter of the American Fisheries Society Annual Meeting, St. Cloud, MN, February 2017. [Abstract] In: Minnesota Chapter of the American Fisheries Society meeting program.

Hrabik, T.R. and B.M. Roth. The role of demersal prey in diel vertical movement by siscowet (*Salvelinus namaycush* siscowet) in Lake Superior. International Association for Great Lakes Research Annual Meeting, Guelph, ON, June 2016. [Abstract] In: International Association for Great Lakes Research meeting program. <http://iaglr.org/conference/about.php>

Hrabik, T.R. and B.M. Roth. The role of demersal prey in diel vertical movement by siscowet (*Salvelinus namaycush* siscowet) in Lake Superior. Minnesota Chapter of the American Fisheries Society Annual Meeting, Mankato, MN, February 2016. [Abstract] In: Minnesota Chapter of the American Fisheries Society meeting program.

Hrabik, T.R., B.M. Roth and T.D. Ahrenstorff. Predation risk and prey fish vertical migration in Lake Superior: insights from an individual based model of siscowet (*Salvelinus namaycush*). The American Fisheries Society Annual Meeting, Quebec City, Quebec, August 2014. [Abstract] In: The American Fisheries Society annual meeting program.

Hrabik, T.R., B.M. Roth and T.D. Ahrenstorff. Predation risk and prey fish vertical migration in Lake Superior. Minnesota Chapter of the American Fisheries Society Annual Meeting, Mankato, MN, March 2014. [Abstract] In: Minnesota Chapter of the American Fisheries Society meeting program.

Hrabik, T.R., B.M. Roth, D. Yule, O.T. Gorman, M. Vinson. 2013. Variability in Diel Vertical Migrations by Siscowet Lake Trout in Lake Superior: When Does it Pay to Migrate Every Day? Minnesota Chapter of the American Fisheries Society Annual Meeting, St. Cloud, MN, March 2013. [Abstract] In: Minnesota Chapter of the American Fisheries Society meeting program.

Hrabik, T.R., B.M. Roth, D. Yule, O.T. Gorman, M. Vinson. 2012. Variability in Diel Vertical Migrations by Siscowet Lake Trout in Lake Superior: When Does it Pay to Migrate Every Day? American Fisheries Society Annual Meeting, St. Paul, MN, August 2012. [Abstract] In: American Fisheries Society meeting program.

Hrabik, T.R., E.J. Issac, A. Gamble, B. Roth, M. Vinson, D. Yule, O. Gorman, J. Stockwell, M. Seider. Prey supply and demand in offshore waters of Lake Superior: does diel vertical migration stabilize predator prey interactions? American Fisheries Society Annual Meeting, Seattle, WA, September 2011. [Abstract] In: American Fisheries Society meeting program.

Hrabik, T.R., E.J. Issac, A. Gamble, B. Roth, M. Vinson, D. Yule, O. Gorman, J. Stockwell, M. Seider. Prey supply and demand in offshore waters of Lake Superior: what is the cost of diel vertical migration?

International Association for Great Lakes Research, Duluth, MN, June 2011. [Abstract] In: International Association for Great Lakes Research meeting program.

Stockwell J., D. Yule., T.R. Hrabik* and M. Sierszen. Cisco as an Energy Vector from Offshore Pelagic to Nearshore Benthic Habitats in Lake Superior. International Association for Great Lakes Research Annual Meeting. Toronto, Ontario. May 2010. *Presenting author.

Hrabik, T.R., D. Branstrator, S. Guildford and R. Hecky. Diel vertical migration in the pelagic waters of Lake Superior: the deep chlorophyll layer and the transport of nutrients. Aquatic Ecosystem Health and Management Society Meeting. Ecology of Lake Superior. Duluth, MN. May 2010.

Hrabik, T. R. Diel vertical migration in the open waters of Lake Superior: implications for nutrient transport to the deep chlorophyll layer. Twin Ports Freshwater Folk meeting, Duluth, MN. 2009.

Hrabik, T.R. Diel vertical migration in three trophic levels of the Lake Superior foodweb. Integrated Biological Sciences Colloquium. Oct. 2009.

Hrabik, T.R., M. Balge, J. Stockwell and O. P. Jensen. Diel vertical migration in Lake Superior: the vertical movement of siscowet lake trout in response to prey availability. Oral Presentation. Minnesota, Wisconsin and Ontario Chapter Meeting of American Fisheries Society. Duluth, MN 2009.

Hrabik, T.R. Conservation of *Hucho taimen* in the Eg-Uur watershed in northern Mongolia. Integrated Biosciences Program. University of Minnesota, Duluth. Duluth, MN. Feb. 2008.

Hrabik, T.R., M. Balge, J. Stockwell and O. P. Jensen. Diel vertical migration in Lake Superior: variability in the vertical movement of siscowet lake trout in response to prey availability. Oral Presentation. [Abstract] In: American Fisheries Society meeting program. San Francisco, CA. Sept. 2007.

Hrabik, T.R. Diel migration in the Lake Superior pelagic fish community. Integrated Biosciences Program. University of Minnesota, Duluth. Duluth, MN. March. 2007

Hrabik, T. R., M. Balge, J. Stockwell and D. Yule. The influence of sample density and coverage on hydroacoustic estimates of pelagic fishes in Lake Superior. American Fisheries Society Annual Meeting. Oral Presentation. [Abstract] In: American Fisheries Society meeting program. Lake Placid, NY. August 2006.

Hrabik, T.R. Changes in aquatic ecosystems: species interactions and anthropogenic influences in a food web context. Department of Biology. University of Minnesota, Duluth. Duluth, MN. Oct. 2005.

Hrabik, T. R., M. Balge and J. Stockwell. The influence of sample density and spatial coverage on estimates of density and biomass of Lake Superior pelagic fishes. International Association for Great Lakes Research Annual Meeting. Oral Presentation. [Abstract] In: International Association for Great Lakes Research meeting program. Ann Arbor MI. May 2005.

Hrabik, T. R. Foodweb configurations and dominance by exotic rainbow smelt. Science and the Northwoods Meeting. Boulder Junction, WI. Sept. 2004.
<http://limnology.wisc.edu/currentevents/snw/index.htm>

Hrabik, T. R. and B. M. Roth. Hydroacoustic assessment of pelagic fish in small lakes: the influence of acoustic frequency and spatial coverage on population estimates and uncertainty. American Fisheries Society Annual Meeting. Oral Presentation. [Abstract] In: American Fisheries Society meeting program. Madison, WI August. 2004.

Hrabik, T. R., M. Balge, K. Cullis, O. Gorman, D. Yule, J. Stockwell and D. Mason. Development of Lakewide Acoustic Assessment Program for Lake Superior. Oral presentation. Great Lakes Fishery Commission Annual Meeting. Ypsilanti, MI. March 2004.

Hrabik, T.R. Diel vertical migration in Lake Superior ciscoes. Invited presentation. Fish Ecology Symposium. Minnesota Chapter, American Fisheries Society Annual Meeting. St. Cloud, MN. March 2004.

Hrabik, T. R. Johnson, L. B. Brady, V. J. Breneman, D. H. Ciborowski, J. Richards, C. Quantifying the influence of landscape characteristics on fish communities in coastal riverine wetlands for use as indicators. American Society of Limnology and Oceanography. Oral Presentation. [Abstract] In: American Society of Limnology and Oceanography Meeting Program. February 2003.

Hrabik, T.R., O.Gorman. Identifying bias in bottom trawl data using hydroacoustics. Minnesota Chapter of the American Fisheries Society. Duluth, MN March, 2003.

Hrabik, T. R., B. Greenfield, D. B. Lewis, T. K. Kratz, A. I. Pollard and K. A. Wilson. 2000. Variability in species richness among four taxonomic groups in North Temperate Lakes with varying chemical characteristics and stream connectivity. Oral Presentation. Ecological Society of America Annual Meeting. [Abstract] In: Ecological Society of America Meeting Program. August, 2000.

Hrabik, T. R., M. P. Carey, and M. S. Webster. 1999. Interactions between exotic rainbow smelt (*Osmerus mordax*) young-of-year and native yellow perch (*Perca flavescens*) young-of-year in a north temperate lake. Oral Presentation. Midwest Fish and Wildlife Conference. December, 1999. [Abstract] In: Midwest Fish and Wildlife Conference Annual Meeting Program. December, 1999.

Hrabik, T. R. and J. J. Magnuson. 1997. Invited Presentation: Distribution and spread of an exotic fish within a northern Wisconsin watershed: factors influencing dispersal. Invited Oral Presentation in Symposium entitled Space, Time and Scale: New Perspectives in Fish Ecology. American Fisheries Society annual meeting. Monterey, CA, August, 1997

Hrabik, T. R. and J. J. Magnuson. 1997. Factors influencing the distribution and spread of an exotic fish within a northern Wisconsin watershed. Oral Presentation. Midwest Fish and Wildlife Conference. [Abstract] In: Midwest Fish and Wildlife Conference Annual Meeting Program, .December, 1997.

Hrabik, T. R., J. J. Magnuson and A. S. McLain. 1996. Predation and Competition by rainbow smelt on native fishes: evidence from long-term research on two northern Wisconsin Lakes. Oral Presentation. Midwest Fish and Wildlife Conference annual meeting. [Abstract]. In: Midwest Fish and Wildlife Conference Annual Meeting Program. December, 1996.

Hrabik, T. R. and J. J. Magnuson. 1995. Feeding and distribution of rainbow smelt and native fishes in Wisconsin: evidence for competition. Oral Presentation. Ecological Society of America annual meeting. [Abstract] In: Ecological Society of America 80th annual meeting program Aug, 1995.

Hrabik, T. R. and J. J. Magnuson. 1994. Feeding Selectivity and Periodicity of Rainbow Smelt and Native Fish Species in Two Oligotrophic Environments. Oral Presentation. Midwest Fish and Wildlife Conference, [Abstract] In: Midwest Fish and Wildlife Conference Annual Meeting Program. December, 1994

Presentations at other Institutions

2016. Invited presentation. Food web dynamics and nutrient transport in the offshore waters of Lake Superior. Michigan State University. November, 2016.

2016. Invited presentation. Species interactions and ecology of salmonids in the Eg-Uur watershed, Mongolia. Department Fisheries, Wildlife and Conservation Biology. University of Minnesota, St. Paul Campus, April 2016.

2016. Invited presentation. Food web interactions and nutrient transport in the offshore waters of Lake Superior. University of Florida at Gainesville. February 2016.

2015. Invited presentation. Trophic interactions and nutrient flow in the Lake Superior food web. Warnell School of Forestry and Natural Resources, University of Georgia at Athens. March 2015.

2013. Invited Presentation. The dynamic movement of organisms and nutrients in Lake Superior. Rutgers University. January, 2013.

2012. Invited Presentation. Trophic interactions, the deep chlorophyll layer and the movement of nutrients in Lake Superior. University of Washington (Seattle), School of Aquatic and Fishery Sciences. May 2012

2012. Invited Presentation. Trophic interactions, the deep chlorophyll layer and the movement of nutrients in Lake Superior. Great Lakes Aquarium. March 2012

2011. Invited Presentation. Allocation of species composition to hydroacoustic information in Lake Superior using TREE based models. Freshwater Institute, Stockholm Sweden. Oct. 2011.

2011. Invited Presentation. The deep chlorophyll layer and the movement of nutrients in Lake Superior. Invited presentation. Gulf of Maine Research Institute, Portland, ME, April 2011.

2010. Invited Presentation. Food web connections and the movement of nutrients in Lake Superior. Invited presentation. University of Illinois at Urbana-Champaign. Illinois Natural History Survey. Nov. 2010

2010 Invited Presentation. Lake Superior hydroacoustic assessment: estimating needed sampling effort and assigning single target identity. Plum Brook NASA, USGS laboratory, Sandusky, Ohio. Sept. 2010.

- 2010 Food web connections and the movement of nutrients in Lake Superior. University of Wisconsin-Madison, Trout Lake Research Station Seminar Series. July 2010.
2008. Invited Presentation. Estimating pelagic fish densities and biomass using hydroacoustics in small lakes: lessons learned on acoustic frequency and sample density. Minnesota Department of Natural Resources, Research Division. Cloquet, MN. November, 2008.
2008. Invited Presentation (Part of an invited panel to review the USGS integrated sampling plan for Lake Superior). Identifying appropriate spatial resolution for the analysis of hydroacoustic data. United States Geological Survey, Lake Superior Biological Station. Ashland WI. July, 2008.
2006. Invited Presentation. Changes in aquatic ecosystems: species interactions and anthropogenic influences in a food web context. St. Mary's College. Winona, MN. Oct. 2006.
2004. Invited Presentation. Hydroacoustic estimates of prey fish density and biomass in Minnesota waters of Lake Superior and implications for management. MN DNR, Lake Superior Fisheries Management Conference. Cloquet, MN Dec. 4. 2004.
2004. The invasion ecology of exotic rainbow smelt in space and time. University of Wisconsin, Center for Limnology-Trout Lake Research Station Seminar Series. July 2004.
2003. Indicators of anthropogenic disturbance in the Laurentian Great Lakes. University of Wisconsin, Center for Limnology-Trout Lake Research Station Seminar Series. July 2003.
2002. Invited Seminar. Local and regional factors influencing aquatic ecosystems: perspectives on management opportunities. MN DNR-Fisheries Research Division Meeting. Natural Resources Research Institute, Duluth, MN, August, 2002.
- 2002 Invited Seminar. Aspects of aquatic ecology in northern temperate lakes. Dept. of Fisheries and Wildlife Colloquium, University of Minnesota-St. Paul Campus. April, 2002.
- 2002 Integrating small and large lake ecology. University of Wisconsin, Center for Limnology-Trout Lake Research Station Seminar Series. July 2002.
- 2001 Invited Seminar. Spatial and temporal variability in fish communities: the effects of an invasive fish species. Dept. of Fisheries and Wildlife, Michigan State University. Oct. 2001
- 2001 The effects of rainbow smelt on native fishes in Wisconsin and their dispersal. University of Wisconsin, Center for Limnology - Trout Lake Research Station Seminar Series. July 2001
- 2000 Invited Seminar. Local and regional processes influencing aquatic communities. Dept. of Fisheries and Wildlife. Utah State University. May 2000.
- 2000 Invited Seminar. Local and regional processes influencing aquatic communities Dept. of Biology. University of Minnesota. Duluth Campus. May 2000.

Other Lectures

2015. Invited Presentation. Trophic ecology and food web interactions in Lake Superior. Water Resources Science Seminar Series. Duluth, MN. February 2015.

2014. Invited Presentation. Trophic interactions and nutrient cycling in the offshore waters of Lake Superior. Integrated Biosciences Colloquium. Duluth, MN.

2012. Invited Presentation. Conservation biology of *Hucho taimien* in Mongolia. Integrated Biosciences Colloquium. Duluth, MN.

2010. Invited Presentation. Diel vertical movements of Lake Superior fishes. Integrated Biosciences Colloquium. Duluth, MN.

2000 Invited Lecture. Competition in Fishes. Fish Ecology: Zoology 510 Lecture. March 2, 2000. University of Wisconsin-Madison.

1999 Invited Lecture: Directive Factors Influencing Fish Distribution. Fish Ecology: Zoology 510 Lecture. February. 1999. University of Wisconsin-Madison.

1995 Invited Lecture: Fish Ecology. Limnology-Conservation of Aquatic Resources: Zoology 315 Lecture. November 7, 1996. University of Wisconsin-Madison.

Other Regional Presentations

Date	Organization	Location	Title of Presentation
2016	Trout Unlimited	Hudson, WI	Ecology of <i>Hucho taimien</i> in Mongolia
2012	Great Lakes Aquarium	Duluth, MN	Trophic interactions in the offshore waters of Lake Superior
2012	Minnesota DNR	Duluth, MN	Implementation of an acoustic survey for the assessment of cisco in Minnesota Waters of Lake Superior
2011	Great Lakes Fishery Commission – Lake Superior Technical Committee	Ashland, WI	Prey supply and demand in offshore waters of Lake Superior: what is the cost of diel vertical migration?
2011	Great Lakes Fishery Commission – Lake Superior Technical Committee	Ashland, WI	Lake Superior Hydroacoustic Assessment: approaches for estimating sampling effort and assigning single target identity
2008	Great Lakes Fishery Commission – Lake Superior Technical Committee	Marquette, MI	The role of siscowet in the pelagic food web of Lake Superior
2006	Great Lakes Fishery Commission, Native Fish Workshop (invited)	Ypsilanti, MI	Diel migration in the Lake Superior pelagic community: variability in the vertical migration of coregonids in response to varying predation risk.
2006	Minnesota Chapter of the American Fisheries Society	Brainerd, MN	Diel vertical migration in the Lake Superior pelagic community: variability in the extent of migration in coregonids in response to varying predation risk
2005	Lake Superior Technical Committee of the Great Lakes Fishery Commission	Brimley, MI	Spatial variability in catch rates of adult lake herring in mid-water trawls in Lake Superior
2005	Lake Superior Advisory Group (Mn DNR)	Duluth, MN	The development of a hydroacoustic survey design for the Minnesota waters of Lake Superior.
2004	Lake Superior Fisheries	Cloquet, MN	Estimation of prey fish biomass in the

	Conference (Mn DNR)		Minnesota waters of Lake Superior using Hydroacoustics
2004 (Aug.)	Lake Superior Technical Committee of the Great Lakes Fishery Commission	Copper Harbor, MI	Hydroacoustic estimates of biomass of pelagic prey fish in Lake Superior
2004 (Jan.)	Lake Superior Technical Committee of the Great Lakes Fishery Commission	Ashland, WI	Hydroacoustic assessment of pelagic prey fish in Lake Superior
2004	Great Lakes Fishery Commission	Ypsilanti, MI	Progress in the Development of Lakewide Acoustic Assessment Program for Lake Superior.
2003	Lake Superior Technical Committee of the Great Lakes Fishery Commission	Duluth, MN	Development of a lakewide hydroacoustic assessment for Lake Superior
2002	Lake Superior Technical Committee of the Great Lakes Fishery Commission	Duluth, MN	Analysis of predator diet information in Lake Superior
