

Travis O. Brenden, Ph.D.

Professor/Associate Director

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PROFESSIONAL NARRATIVE SUMMARY

My assignment in the Michigan State University Department of Fisheries and Wildlife is 30% research, 20% instruction, 15% extension/outreach, and 35% administration and leadership/service. I serve as Associate Director of the Quantitative Fisheries Center, (QFC; www.canr.msu.edu/qfc), a research, outreach, and education center housed within the Department of Fisheries and Wildlife that provides analytic and modeling assistance to fishery management agencies within the Great Lakes region. I develop, apply, and teach simulation modeling and advanced data analytic/computational techniques to address contemporary fishery management challenges. My recent research has focused on three primary themes: 1) the assessment and management of fisheries that exploit fish from multiple spawning populations (i.e., intermixed fisheries); 2) modeling/research to inform invasive species control efforts; and 3) modeling to combat pathogen outbreaks in fish populations. My research program is closely aligned with my outreach efforts and many of my research projects originated from outreach interactions with QFC supporting partner biologists. My teaching activities primarily center on the development and delivery of short courses and online courses on quantitative techniques.

PROFESSIONAL PROGRESSION

- Professor (Fixed term)/Associate Director 2020-present
Quantitative Fisheries Center, Department of Fisheries and Wildlife
- Associate Professor (Fixed term)/Associate Director 2012-2020
Quantitative Fisheries Center, Department of Fisheries and Wildlife
Michigan State University, East Lansing, Michigan
- Assistant Professor (Fixed term)/Associate Director 2006-2012
Quantitative Fisheries Center, Department of Fisheries and Wildlife
Michigan State University, East Lansing, Michigan
- Research Associate II 2004-2006
School of Natural Resources and Environment, University of Michigan
- MS & PhD Graduate Research/Teaching Assistant 1997-2003
Department of Fisheries and Wildlife Sciences, Virginia Polytechnic Institute & State University
- Stream-Studies Technician 1996
South Dakota Cooperative Fish & Wildlife Research Unit, South Dakota State University

EDUCATION

- Ph.D. - Fisheries & Wildlife Science 2000-2005
Virginia Polytechnic Institute & State University
Dissertation title: Evaluation of current management strategies for the New River, Virginia, muskellunge fishery: modeling the effect of alternative harvest regulations and habitat selection
- M.S. - Statistics 1999-2001
Virginia Polytechnic Institute & State University
- M.S. - Fisheries & Wildlife Science 1997-1999
Virginia Polytechnic Institute & State University
Thesis title: Competition between age-0 largemouth bass and juvenile bluegills in a Virginia pond
- B.S. - Biological Science (Minor: Criminal Justice) 1994-1996

FELLOWSHIPS/AWARDS

- Besadny Award to the Quantitative Fisheries Center for Fostering Great Lakes Partnerships from the Great Lakes Fishery Commission (2018)
- Best Poster Award by DVM Student – 2014 MSU College of Veterinary Medicine Phi Zeta Research Days (Millard et al. 2014)
- Appreciation Award for Journal of Great Lakes Research Special Issue Editing from the International Association for Great Lakes Research (2011)
- AT&T Faculty-Staff Instructional Technology Award of Excellence from Michigan State University for on-line course development (with Angie Leslie, Jim Bence, Matt Catalano) (2011)
- Georgia-Pacific Endowed Dean's Fellowship, College of Natural Resources, Virginia Polytechnic Institute & State University (2001)
- Burd McGinnes Fellowship, Department of Fisheries & Wildlife Sciences, Virginia Polytechnic Institute & State University (2000, 2003)
- Graduate Student Service Award, Virginia Polytechnic Institute & State University (1999)
- Best Student Paper Award, Honorable Mention – 1999 Virginia - North Carolina Joint AFS Meeting (Brenden and Murphy 1999)
- Member-of-the-Year Award, Virginia Tech Chapter of the American Fisheries Society (1997-1998)
- Graduated with Highest Honor from South Dakota State University (1996)
- South Dakota Conservation Officer's Association Scholarship, South Dakota State University (1996)
- Wilbur Allen Scholarship, South Dakota State University (Spring & Fall 1995, Spring & Fall 1996)

PUBLISHED WORKS

(* = Indicates graduate student I supervised; † = Indicates research associate I supervised; ‡ = Indicates graduate student on whose committee I served)

Published Book Chapters

1. Ogle, D.H., **T.O. Brenden**, and J.L. McCormick. 2017. Growth estimation: growth models and statistical inference. Pages 265-359 in M. Quist and D. Isermann, editors. Age and growth of fishes: principles and techniques. American Fisheries Society, Bethesda, Maryland.
2. **Brenden, T.O.**, R.W. Brown, M.P. Ebener, K. Reid, and T.J. Newcomb. 2013. Great Lakes commercial fisheries: historical overview and prognoses for the future. Pages 339-397 in W.W. Taylor, A.J. Lynch, and N.J. Leonard, editors. Great Lakes fisheries policy and management: a binational perspective, 2nd edition, Michigan State University Press, East Lansing, Michigan.
3. **Brenden, T.O.**, R.D. Clark, Jr., A.R. Cooper, P.W. Seelbach, L. Wang, S.S. Aichele, E.G. Bissell, and J.S. Stewart. 2006. A GIS framework for collecting, managing, and analyzing multi-scale landscape variables across large regions for river conservation and management. Pages 49-74 in R.M. Hughes, L. Wang, and P.W. Seelbach, editors. Influences of landscapes on stream habitats and biological assemblages. American Fisheries Society, Symposium 48, Bethesda, Maryland.

Published or In press Manuscripts in Peer-Review Journals

1. Koel, T.M., J.L. Arnold, P.E. Bigelow, **T.O. Brenden**, J.D. Davis, C.R. Detjens, P.D. Doepke, B.D. Ertel, H.C. Glassic, R.E. Gresswell, C.S. Guy, D.J. MacDonald, M.E. Ruhl, T.J. Stuth, D.P. Sweet, J.M. Syslo, N.A. Thomas, L.M. Tronstad, P.J. White, and A.V. Zale. 2020. Yellowstone Lake ecosystem restoration: a case study for invasive fish management. *Fishes* 5(2):18
<https://doi.org/10.3390/fishes5020018>
2. Robinson, K.F., M. DuFour, M. Jones, S. Herbst, T. Newcomb, J. Boase, **T. Brenden**, D. Chapman, J. Dettmers, J. Francis, T. Hartman, P. Kocovsky, B. Locke, C. Mayer, and J. Tyson. In press. Using decision analysis to collaboratively respond to invasive species threats: a case study of Lake Erie grass carp (*Ctenopharyngodon idella*). *Journal of Great Lakes Research*
3. Harris[†], C., **T.O. Brenden**, C.S. Vandergoot, M.D. Faust, S.J. Herbst, and C.C. Krueger. In press. Tributary use and large-scale movements of grass carp in Lake Erie. *Journal of Great Lakes Research*

4. Syslo, J.M., **T.O. Brenden**, C.S. Guy, T.M. Koel, P.E. Bigelow, P.D. Doepke, J.L. Arnold, and B.D. Ertel. 2020. Could ecological release buffer suppression efforts to reduce non-native lake trout abundances in Yellowstone Lake, Yellowstone National Park? *Canadian Journal of Fisheries and Aquatic Sciences* 77:1010-1025.
5. Hunter[‡], R.D., E.F. Roseman, N.M. Sard, D.B. Hayes, **T.O. Brenden**, R.L. DeBruyne, and K.T. Scribner. 2020. Egg and larval collection methods affect numbers of spawning adults inferred by pedigree analysis. *North American Journal of Fisheries Management* 40:307-319.
6. Vincent[‡], M.T., **T.O. Brenden**, and J.R. Bence. 2020. Parameter estimation performance of a recovery-conditioned integrated tagging catch-at-age analysis model. *Fisheries Research* 224:105451.
7. Faust, M.D., C.S. Vandergoot, **T.O. Brenden**, R.T. Kraus, T. Hartman, and C.C. Krueger. 2019. Acoustic telemetry as a potential tool for mixed-stock analysis of fishery harvest: a feasibility study using Lake Erie walleye. *Canadian Journal of Fisheries and Aquatic Sciences* 76:1019-1030.
8. Brownscombe, J.W., E.J.I. Lédée, G.D. Raby, D.P. Struthers, L.F.G. Gutowsky, V.M. Nguyen, N. Young, M.J.W. Stokesbury, C.M. Holbrook, **T.O. Brenden**, C.S. Vandergoot, K.J. Murchie, K. Whoriskey, J.M. Fleming, S.T. Kessel, C.C. Krueger, and S. J. Cooke. 2019. Conducting and interpreting fish telemetry studies: considerations for researchers and resource managers. *Reviews in Fish Biology and Fisheries* 29:369-400.
9. Boonthai, T., T.P. Loch, C.J. Yamashita, G.D. Smith, A.D. Winters, M. Kiupel, **T.O. Brenden**, and M. Faisal. 2018. Laboratory investigation into the role of largemouth bass virus (Ranavirus, Iridoviridae) in smallmouth bass mortality events in Pennsylvania rivers. *BMC Veterinary Research* 14:62.
10. **Brenden, T.O.**, I. Tsehaye[‡], J.R. Bence, W. Liu, J. Kanefsky, and K.T. Scribner. 2018. Indexing recruitment for source populations contributing to mixed fisheries by incorporating age in genetic stock identification models. *Canadian Journal of Fisheries and Aquatic Sciences* 75:934-954.
11. **Brenden, T.O.**, R. Reilly, E. Eisch, A. Switzer, and G. Whelan. 2018. Temporal variation in total phosphorus concentrations revealed from a multidecadal monitoring program on Platte Lake, Michigan. *Environmental Monitoring and Assessment* 190:430.
12. Ivan[‡], L.N., **T.O. Brenden**, I.F. Standish[‡], and M. Faisal. 2018. Individual-based model evaluation of using vaccinated hatchery fish to minimize disease spread in wild fish populations. *Ecosphere* 9:e02116.
13. Li[‡], Y., J.R. Bence, and **T.O. Brenden**. 2018. Can spawning origin information of catch or a recruitment penalty improve assessment and fishery management performance for a spatially structured stock assessment model? *Canadian Journal of Fisheries and Aquatic Sciences* 75:2136-2148.
14. Scribner, K.T., I. Tsehaye[‡], **T.O. Brenden**, W. Stott, J. Kanefsky, and J.R. Bence. 2018. Hatchery strain contributions to emerging wild lake trout populations in Lake Huron. *Journal of Heredity* 109:675-688.
15. Cooper[‡], A.R., D.M. Infante, W.M. Daniel, L. Wang, K.E. Wehrly, and **T.O. Brenden**. 2017. Assessment of dam effects on streams and fish assemblages of the conterminous U.S.A. *Science of the Total Environment* 586:879-889.
16. Dawson, H.A., G. Bravener, J. Beaulaurier, N.S. Johnson, M. Twohey, R.L. McLaughlin, and **T.O. Brenden**. 2017. Contribution of manipulable and non-manipulable environmental factors to trapping efficiency of invasive sea lamprey. *Journal of Great Lakes Research* 43:172-181.
17. Johnson, N.S., W.D. Swink, and **T.O. Brenden**. 2017. Field study suggests that sex determination in sea lamprey is directly influenced by larval growth rate. *Proceedings of the Royal Society B* 284: 20170262.
18. Kraus, R.T., C.S. Vandergoot, P.M. Kocovsky, M.W. Rogers, H.A. Cook, and **T.O. Brenden**. 2017. Reconciling walleye catch differences from multiple fishery independent gill net surveys in Lake Erie. *Fisheries Research* 188:17-22.

19. Millard[‡], E.V., S.E. LaPatra, **T.O. Brenden**, A.M. Bourke, S.D. Fitzgerald, and M. Faisal. 2017. DNA vaccination partially protects muskellunge against viral hemorrhagic septicemia virus (VHSV-IVb). *Journal of Aquatic Animal Health* 29:50-56.
20. Schulz[‡], C.A., C.A. Murphy, **T.O. Brenden**, T.P. Loch, and M. Faisal. 2017. Detection accuracy of *Renibacterium salmoninarum* in Chinook salmon, *Oncorhynchus tshawytscha* (Walbaum) from non-lethally collected samples: effects of exposure route and disease severity. *Preventive Veterinary Medicine* 145:110-120.
21. Sitar, S.P., **T.O. Brenden**, J.X. He, and J.E. Johnson. 2017. Recreational postrelease mortality of lake trout in Lakes Superior and Huron. *North American Journal of Fisheries Management* 37:789-808.
22. Throckmorton[‡], E., **T. Brenden**, A. Peters, T. Newcomb, G. Whelan, and M. Faisal. 2017. Potential reservoirs and risk factors for VHSV IVb in an enzootic system: Budd Lake, Michigan, United States. *Journal of Aquatic Animal Health* 29:31-42.
23. Vincent[†], M.T., **T.O. Brenden**, and J.R. Bence. 2017. Simulation testing the robustness of a multi-region tag-integrated assessment model that exhibits natal homing and estimates natural mortality and reporting rate. *Canadian Journal of Fisheries and Aquatic Sciences* 74:1930-1949.
24. Cooper[‡], A.R., D.M. Infante, K.E. Wehrly, L. Wang, and **T.O. Brenden**. 2016. Identifying indicators and quantifying large-scale effects of dams on fishes. *Ecological Indicators* 61:646-657.
25. Johnson, N.S., **T.O. Brenden**, W.D. Swink, and M. Lipps. 2016. Survival and metamorphosis of larval sea lamprey (*Petromyzon marinus*) residing in Lakes Michigan and Huron near river mouths. *Journal of Great Lakes Research* 42:1461-1469.
26. Li, Y., J.R. Bence, and **T.O. Brenden**. 2016. The influence of stock assessment frequency on achievement of fishery management objectives. *North American Journal of Fisheries Management* 36:793-812.
27. Standish[‡], I.F., **T.O. Brenden**, and M. Faisal. 2016. Does herd immunity exist in aquatic animals? *International Journal of Molecular Sciences* 17:1898.
28. Standish[‡], I.F., E.V. Millard, **T.O. Brenden**, and M. Faisal. 2016. A DNA vaccine encoding the viral hemorrhagic septicemia virus genotype IVb glycoprotein confers protection in muskellunge (*Esox masquinongy*), rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), and lake trout (*Salvelinus namaycush*). *Virology Journal* 13:203; doi:10.1186/s12985-016-0662-8.
29. Tsehaye[‡], I., **T.O. Brenden**, J.R. Bence, W. Liu, K.T. Scribner, J. Kanefsky, K. Bott, and R.F. Elliott. 2016. Combining genetics with age/length data to estimate temporal changes in year-class strength of source populations contributing to mixtures. *Fisheries Research* 173:236-249.
30. **Brenden, T.O.**, J.R. Bence, W. Liu, I. Tsehaye[‡], and K.T. Scribner. 2015. Comparison of the accuracy and consistency of likelihood-based estimation routines for genetic stock identification. *Methods in Ecology and Evolution* 6:817-827.
31. **Brenden, T.O.**, K.T. Scribner, J.R. Bence, I. Tsehaye[‡], J. Kanefsky, C.S. Vandergoot, and D.G. Fielder. 2015. Contributions of Lake Erie and Lake St. Clair walleye populations to the Saginaw Bay, Lake Huron recreational fishery: evidence from genetic stock identification. *North American Journal of Fisheries Management* 35:567-577.
32. Jones, M.L., **T.O. Brenden**, and B.J. Irwin. 2015. Re-examination of sea lamprey control policies for the St. Marys River: completion of an adaptive management cycle. *Canadian Journal of Fisheries and Aquatic Sciences* 72:1538-1551.
33. Li, Y., J.R. Bence, and **T.O. Brenden**. 2015. An evaluation of alternative assessment approaches for intermixing fish populations: a case study with Great Lakes lake whitefish. *ICES Journal of Marine Science* 72:70-81.
34. Throckmorton[‡], E., A. Peters, **T. Brenden**, and M. Faisal. 2015. Direct and indirect evidence suggests the continuous presence of viral hemorrhagic septicemia virus (genotype IVb) in Budd Lake, Michigan: management implications. *North American Journal of Fisheries Management* 35:503-511.
35. Vandergoot[†], C.S., and **T.O. Brenden**. 2015. Accuracy and precision of fishery and demographic estimates from a spatial tag-recovery model when inter-regional movements are treated as fixed. *Fisheries Research* 164:8-25.

36. Winters[‡], A.D., T.L. Marsh, **T.O. Brenden**, and M. Faisal. 2015. Analysis of bacterial communities associated with the benthic amphipod, *Diporeia*, in the Laurentian Great Lakes basin. *Canadian Journal of Microbiology* 61:72-81.
37. Bunnell, D.B., R.P. Barbiero, S.A. Ludsins, C.P. Madenjian, G.J. Warren, D.M. Dolan, **T.O. Brenden**, and 14 others. 2014. Changing ecosystem dynamics in the Laurentian Great Lakes: exploring evidence for bottom-up and top-down regulation. *BioScience* 64:26-39.
38. Johnson, N.S., W.D. Swink, **T.O. Brenden**, J.W. Slade, T.B. Steeves, M.F. Fodale, and M.L. Jones. 2014. Survival and metamorphosis of low-density populations of larval sea lampreys (*Petromyzon marinus*) in streams following lampricide treatment. *Journal of Great Lakes Research* 40:155-163.
39. Millard[‡], E., **T. Brenden**, S. LaPatra, S. Marcquenski, and M. Faisal. 2014. Detection of antibodies to viral hemorrhagic septicemia virus-IVb in fish sera using a competitive ELISA. *Diseases of Aquatic Organisms* 108:187-199.
40. Tsehaye, I., M.L. Jones, **T.O. Brenden**, J.R. Bence, and R.M. Claramunt. 2014. Changes in the salmonine community of Lake Michigan and their implications for predator-prey balance. *Transactions of the American Fisheries Society* 143:420-437.
41. Tsehaye, I., M.L. Jones, J.R. Bence, **T.O. Brenden**, C.P. Madenjian, and D.M. Warner. 2014. A multispecies statistical age-structured model to assess prey-predator balance: application to an intensively managed Lake Michigan pelagic fish community. *Canadian Journal of Fisheries and Aquatic Sciences* 71:627-644.
42. Vandergoot[†], C.S., and **T.O. Brenden**. 2014. Spatially-varying population demographics and fishery characteristics of Lake Erie walleye (*Sander vitreus*) inferred from a long-term tag-recovery study. *Transactions of the American Fisheries Society* 143:188-204.
43. Winters[‡], A.D., T.L. Marsh, **T. Brenden**, and M. Faisal. 2014. Molecular characterization of bacterial communities associated with sediments in the Laurentian Great Lakes. *Journal of Great Lakes Research* 40:640-645.
44. Winters[‡], A.D., S. Fitzgerald, **T.O. Brenden**, T. Nalepa, and M. Faisal. 2014. Spatio-temporal dynamics of parasites infecting *Diporeia* spp. (Amphipoda, Gammaridae) in southern Lake Michigan (USA). *Journal of Invertebrate Pathology* 121:37-45.
45. Molton[†], K.J., **T.O. Brenden**, and J.R. Bence. 2013. Harvest levels that conserve spawning biomass can provide larger and more stable and sustainable yields in intermixed fisheries. *Fisheries Research* 147:264-283.
46. Wang, L., **T. Brenden**, J. Lyons, and D. Infante. 2013. Predictability of in-stream physical habitat for Wisconsin and northern Michigan Wadeable streams using GIS-derived landscape data. *Riparian Ecology and Conservation* 1:11-24.
47. **Brenden, T.O.**, J.R. Bence, and E.B. Szalai. 2012. An age-structured integrated assessment of Chinook salmon population dynamics in Lake Huron's main basin since 1968. *Transactions of the American Fisheries Society* 141:919-933.
48. **Brenden, T.O.**, and Y. Zhao. 2012. Simulation-based evaluation of the accuracy in estimating indirect gillnet selectivity. *Fisheries Research* 134-136:64-72.
49. Faisal, M., C. Schulz, A. Eissa, **T. Brenden**, A. Winters, G. Whelan, M. Wolmagood, E. Eisch, and J. VanAmber. 2012. Epidemiological investigation of *Renibacterium salmoninarum* in three *Oncorhynchus* spp. in Michigan from 2001–2010. *Preventive Veterinary Medicine* 107:260-274.
50. Molton[†], K.J., **T.O. Brenden**, and J.R. Bence. 2012. Control rule performance for intermixing lake whitefish populations in the 1836 Treaty Waters of lakes Huron, Michigan, and Superior: a simulation-based evaluation. *Journal of Great Lakes Research* 38:686-698.
51. Vandergoot[†], C.S., **T.O. Brenden**, M.V. Thomas, D.W. Einhouse, H.A. Cook, and M.W. Turner. 2012. Estimation of tag shedding and reporting rates for Lake Erie jaw tagged walleyes. *North American Journal of Fisheries Management* 32:211-223.
52. Wang, L., **T. Brenden**, Y. Cao, and P. Seelbach. 2012. Delineation and validation of river network spatial scales for water resources and fisheries management. *Environmental Management* 50:875-887.

53. **Brenden, T.O.**, J.R. Bence, B.F. Lantry, J.R. Lantry, and T. Schaner. 2011. Population dynamics of Lake Ontario lake trout during 1985-2007. *North American Journal of Fisheries Management* 31:962-979.
54. Faisal, M., W. Fayed, A. Nour, and **T. Brenden**. 2011. Spatio-temporal dynamics of gastrointestinal helminths infecting four lake whitefish (*Coregonus clupeaformis*) stocks in northern lakes Michigan and Huron, USA. *Journal of Parasitology* 97:760-774.
55. Vandergoot[†], C.S., P.M. Kocovsky, **T.O. Brenden**, and W. Liu. 2011. Selectivity evaluation of two experimental gillnet configurations used to sample Lake Erie walleyes. *North American Journal of Fisheries Management* 31:832-842.
56. **Brenden, T.O.**, M.P. Ebener, and T.M. Sutton. 2010. Assessing the health of lake whitefish populations in the Laurentian Great Lakes: foreword. *Journal of Great Lakes Research* 36(Suppl. 1):1-5.
57. **Brenden, T.O.**, M.L. Jones, and M.P. Ebener. 2010. Sensitivity of tag recovery mortality estimates to tag shedding, handling mortality, and reporting rate inaccuracies. *Journal of Great Lakes Research* 36(Suppl. 1):102-111.
58. **Brenden, T.O.**, M.P. Ebener, T.M. Sutton, M.L. Jones, M.T. Arts, T.B. Johnson, M.A. Koops, G.M. Wright, and M. Faisal. 2010. Assessing the health of lake whitefish populations in the Laurentian Great Lakes: lessons learned and research recommendations. *Journal of Great Lakes Research* 36(Suppl. 1):137-141.
59. Ebener, M.P., **T.O. Brenden**, and M.L. Jones. 2010. Estimates of fishing and natural mortality rates for four lake whitefish stocks in northern lakes Huron and Michigan. *Journal of Great Lakes Research* 36(Suppl. 1):112-122.
60. Ebener, M.P., **T.O. Brenden**, G.M. Wright, M.L. Jones, and M. Faisal. 2010. Spatial and temporal distributions of lake whitefish spawning stocks in northern lakes Michigan and Huron, 2003-2008. *Journal of Great Lakes Research* 36(Suppl. 1):38-51.
61. Faisal, M., W. Fayed, **T.O. Brenden**, A. Nour, M.P. Ebener, G.M. Wright, and M.L. Jones. 2010. Widespread infection of lake whitefish *Coregonus clupeaformis* with the swimbladder nematode *Cystidicola farionis* in northern lakes Michigan and Huron. *Journal of Great Lakes Research* 36(Suppl. 1):18-28.
62. Faisal, M., T.P. Loch, **T.O. Brenden**, A.A. Easa, M.P. Ebener, G.M. Wright, and M.L. Jones. 2010. Assessment of *Renibacterium salmoninarum* infection in four lake whitefish (*Coregonus clupeaformis*) stocks from northern lakes Huron and Michigan. *Journal of Great Lakes Research* 36(Suppl. 1):29-37.
63. Wagner, T., M.L. Jones, M.P. Ebener, M.T. Arts, M. Faisal, **T.O. Brenden**, D. Honeyfield, and G. Wright. 2010. Spatial and temporal dynamics of lake whitefish health measures: linking individual-based indicators to a management-relevant endpoint. *Journal of Great Lakes Research* 36(Suppl. 1):123-136.
64. Wehrly, K.E., **T.O. Brenden**, and L. Wang. 2009. A comparison of statistical approaches for predicting stream temperatures across heterogeneous landscapes. *Journal of the American Water Resources Association* 45:986-997.
65. **Brenden, T.O.**, and J.R. Bence. 2008. Comment: use of piecewise regression models to estimate changing relationships in fisheries. *North American Journal of Fisheries Management* 28:844-846.
66. **Brenden, T.O.**, T. Wagner, and B.R. Murphy. 2008. Novel tools for analyzing proportional size distribution (PSD) index data. *North American Journal of Fisheries Management* 28:1233-1242.
67. **Brenden, T.O.**, L. Wang, and P.W. Seelbach. 2008. A river valley segment classification of Michigan streams based on fish and physical attributes. *Transactions of the American Fisheries Society* 137:1621-1636.
68. **Brenden, T.O.**, L. Wang, and Z. Su. 2008. Quantitative identification of disturbance thresholds in support of aquatic resource management. *Environmental Management* 42:821-832.
69. **Brenden, T.O.**, L. Wang, P.W. Seelbach, R.D. Clark, Jr., M.J. Wiley, and B.L. Sparks-Jackson. 2008. A spatially-constrained clustering program for river valley segment delineation from GIS digital river networks. *Environmental Modelling and Software* 23:638-649.

70. Wagner, T., M.E. Benbow, **T.O. Brenden**, J. Qi, and R.C. Johnson. 2008. *Buruli ulcer* disease prevalence in Benin, West Africa: associations with land use/cover and the identification of disease clusters. *International Journal of Health Geographics* 7:25.
71. Wang, L., **T. Brenden**, P. Seelbach, A. Cooper, D. Allan, R. Clark, Jr., and M. Wiley. 2008. Landscape based identification of human disturbance gradients and reference conditions for Michigan streams. *Environmental Monitoring and Assessment* 141:1-17.
72. **Brenden, T.O.**, E.M. Hallerman, B.R. Murphy, J.R. Copeland, and J.A. Williams. 2007. The New River, Virginia, muskellunge fishery: population dynamics, harvest regulation modeling, and angler attitudes. *Environmental Biology of Fishes* 79:11-25.
73. **Brenden, T.O.**, L. Wang, P.W. Seelbach, R.D. Clark, Jr., and J. Lyons. 2007. Comparison between model-predicted and field-measured stream habitat features for evaluating fish assemblage-habitat relationships. *Transactions of the American Fisheries Society* 136:580-592.
74. **Brenden, T.O.**, and B.R. Murphy. 2006. Variance-covariance estimation of standard weight equation coefficients. *Journal of Freshwater Ecology* 21:1-7.
75. **Brenden, T.O.**, E.M. Hallerman, and B.R. Murphy. 2006. Sectioned pelvic fin ray ageing of muskellunge *Esox masquinongy* from a Virginia river: comparisons among readers, with cleithrum estimates, and with tag-recapture growth data. *Fisheries Management and Ecology* 13:31-37.
76. **Brenden, T.O.**, B.R. Murphy, and E.M. Hallerman. 2006. The effect of discharge on daytime habitat use and selection of muskellunge in the New River, Virginia. *Transactions of the American Fisheries Society* 135:1546-1558.
77. **Brenden, T.O.**, B.R. Murphy, and E.M. Hallerman. 2005. Predatory impact of muskellunge on New River, Virginia, smallmouth bass. *Proceedings of the Southeastern Association of Fish and Wildlife Agencies* 58(2004):12-22.
78. **Brenden, T.O.**, and B.R. Murphy. 2004. Experimental assessment of age-0 largemouth bass and juvenile bluegill competition in a small impoundment in Virginia. *North American Journal of Fisheries Management* 24:1058-1070.
79. **Brenden, T.O.**, B.R. Murphy, and E.M. Hallerman. 2004. Estimating total error in locating radiotelemetry transmitters by homing in a riverine environment. *Journal of Freshwater Ecology* 19:295-304.
80. Lindell, S., B. Delbos, R. Perham, J. Goldman, E.M. Hallerman, and **T.O. Brenden**. 2004. Hatchery and grow-out performance of sunshine bass and backcross hybrid striped bass in recirculating aquaculture systems. *International Journal of Recirculating Aquaculture* 5:43-54.
81. **Brenden, T.O.**, B.R. Murphy, and J.B. Birch. 2003. Statistical properties of the relative weight (W_r) index and an alternative procedure for testing W_r differences between groups. *North American Journal of Fisheries Management* 23:1136-1151.
82. **Brenden, T.O.**, and B.R. Murphy. 2002. Trophic dynamics of a slow growing age-0 largemouth bass cohort from a Virginia small impoundment. *Journal of Freshwater Ecology* 17:609-619.
83. **Brenden, T.O.**, and J.A. Williams. 2001. New records of *Esox niger* Lesueur, 1818 and *Lepisosteus osseus* (Linnaeus, 1758) in the New River, Virginia. *Banisteria (Journal of the Virginia Natural History Society)* 18:44.
84. **Brenden, T.O.**, B.R. Murphy, S. Manos, and C.S. Vandergoot. 1999. A submerged cage designed for aquatic research. *North American Journal of Aquaculture* 61:359-362.

PUBLISHED WORKS IN DEVELOPMENT

(*= Indicates student I supervised; ‡ = Indicates research associate I supervised; † = Indicates graduate student on whose committee I served)

Edited Volumes

1. Guy, C.S., M.L. Brown, and **T.O. Brenden**. In preparation. Analysis of freshwater fisheries data, 2nd. Edition. American Fisheries Society, Bethesda, Maryland.

Manuscripts In Preparation or In Review (only fully drafted manuscripts listed)

1. Woodard[†], G., **T.O. Brenden**, and W. Mattes. In review. Contemporary diets of Lake Superior lake whitefish and changes in fish condition from the 1980s to 2010s. Target journal: Journal of Great Lakes Research
2. Dennhardt, A.J., W.W. Fetzer, R.A. Cottrill, D.A. McLeish, J.R. Bence, and **T.O. Brenden**. In preparation. Spatiotemporal dynamics of nearshore and offshore fish communities in Ontario waters of Lake Huron, 1998-2011. Target Journal: Journal of Great Lakes Research
3. Harris[†], C., **T.O. Brenden**, C.S. Vandergoot, M.D. Faust, S.J. Herbst, J.T. Buskiewicz, L.R. Nathan, J.L. Fischer, and C.C. Krueger. In preparation. Movement and space use of grass carp in the Sandusky River: Implications for Lake Erie control efforts. Target Journal: North American Journal of Fisheries Management
4. Peterson[‡], L.K., M.L. Jones, **T.O. Brenden**, C.M. Holbrook, C.S. Vandergoot, and C.C. Krueger. In preparation. Evaluating methods for estimating mortality using simulated acoustic telemetry data. Target Journal: Canadian Journal of Fisheries and Aquatic Sciences
5. Scribner, K.T., **T. Brenden**, I. Tsehaye, J. Bence, R. Elliott, M. Donofrio, K Bott, J. Kanefsky, and J. Homola. In preparation. Compositional estimates of lake sturgeon, *Acipenser fulvescens*, populations to mixtures from open-water and river mouth habitats in Lake Michigan. Fisheries Research

COMPLETION AND TECHNICAL REPORTS

(†= Indicates graduate student I supervised; ‡=Indicates research associate I supervised; §= Indicates graduate student on whose committee I served)

1. Bence, J.R., **T.O. Brenden**, E.M. Liljestrand. 2019. Feasibility of rehabilitating and supplementing fisheries by stocking lake whitefish in the upper Great Lakes. Great Lakes Fishery Trust, Project Completion Report, East Lansing, Michigan.
2. **Brenden, T.O.**, C. Harris[†], C.C. Krueger, C.S. Vandergoot, M.D. Faust, and S.J. Herbst. 2019. Tributary us and large-scale movements of grass carp in Lake Erie. Michigan Department of Natural Resources, Project Completion Report, East Lansing, Michigan.
3. **Brenden, T.O.**, J.R. Bence, Y. Li[§], and M.T. Vincent[†]. 2016. Finding appropriate harvest policies for admixed fisheries to ensure long-term population sustainability of native Great Lake fishes. Great Lakes Fishery Trust, Project Completion Report, East Lansing, Michigan.
4. Faisal, M., **T.O. Brenden**, I.F. Standish[‡], and L.N. Ivan[†]. 2016. Elucidating the role of herd immunity in protecting Lake Michigan fish against the viral hemorrhagic septicemia virus. Great Lakes Fishery Trust, Project Completion Report, East Lansing, Michigan.
5. Johnson, N.S., W.D. Swink, **T.O. Brenden**, and M. Lipps. 2016. Determine the contribution of transformers from lentic areas to sea lamprey populations in Lakes Huron and Michigan. Great Lakes Fishery Commission, Project Completion Report, Ann Arbor, Michigan.
6. **Brenden, T.O.**, J.R. Bence, K.T. Scribner, I. Tsehaye[†], and W. Liu. 2015. Simultaneous analysis of genetic and age data to estimate stock contribution for mixed-stock and strain, open-water fisheries in the Great Lakes. Great Lakes Fishery Trust, Project Completion Report, East Lansing, Michigan.
7. Scribner, K., I. Tsehaye[†], **T. Brenden**, W. Stott, J. Kanefsky, and J. Bence. 2015. Joint analysis of genetic and age data to estimate trends in strain-specific recruitment of emerging wild lake trout populations in Lake Huron. Great Lakes Fishery Commission, Project Completion Report, Ann Arbor, Michigan.
8. Venturelli, P, J. Bence, **T. Brenden**, N. Lester, and L. Rudstam. 2015. Mille Lacs Lake walleye blue ribbon panel data review and recommendations for future data collection and management. Final Report to the Minnesota Department of Natural Resources.
9. Bence, J., **T. Brenden**, and R. Reilly[†]. 2014. Quantitative Fisheries Center review of walleye population management on Mille Lacs Lake, Minnesota. Final Report to the Minnesota Department of Natural Resources.
10. Johnson, N.S., W.D. Swink, **T.O. Brenden**, J.W. Slade, T.B. Steeves, M.F. Fodale, and M.L. Jones. 2013. Tracking transformation of low-density populations of larval sea lampreys in streams tributary

to Lakes Huron and Michigan following treatment with lampricides. Great Lakes Fishery Commission, Project Completion Report, Ann Arbor, Michigan.

11. Jones, M.L., **T.O. Brenden**, and B.J. Irwin. 2012. Evaluating integrated pest management in the St. Marys River. Great Lakes Fishery Commission, Project Completion Report, Ann Arbor, Michigan.
12. Bence, J.R., and **T.O. Brenden**. 2011. Enhancing fishery stock assessment modeling capacity in the Great Lakes. Great Lakes Fishery Commission, Project Completion Report, Ann Arbor, Michigan.
13. **Brenden, T.O.**, and J.X. He. 2010. Coordination workshops concerning early mortality of lake trout in the Great Lakes. Great Lakes Fishery Commission, Project Completion Report, Ann Arbor, Michigan.
14. **Brenden, T.O.**, and W. Liu. 2010. Evaluation of regression approaches for predicting yellow perch (*Perca flavescens*) recreational harvest in Ohio Waters of Lake Erie. Quantitative Fisheries Center Technical Report T2010-01, East Lansing, Michigan.
15. **Brenden, T.O.**, and J.R. Bence. 2009. A model-based evaluation of how stocking Pacific salmonids influences the fish communities of lakes Huron and Ontario. Great Lakes Fishery Commission, Project Completion Report, Ann Arbor, Michigan.
16. Irwin, B.J., **T.O. Brenden**, W. Liu, and J.R. Bence. 2009. Estimating the relationship between sea lamprey-induced mortality on lake trout and observed marking rates. Great Lakes Fishery Commission, Project Completion Report, Ann Arbor, Michigan.
17. Jones, M.L., M.P. Ebener, M.T. Arts, M. Faisal, T. Wagner, **T.O. Brenden**, D. Honeyfield, and G. Wright. 2008. Magnitude and potential causes of mortality in four lake whitefish populations in Lakes Michigan and Huron: a multidisciplinary approach. Great Lakes Fishery Trust, Project Completion Report, Lansing, Michigan.
18. Riseng, C., L. Wang, M. Wiley, E. Rutherford, and **T. Brenden**. 2008. State-of-the-art approaches for assessment of Great Lakes nearshore and large river fish habitat. Great Lakes Fishery Trust, Project Completion Report. Lansing, Michigan.
19. Murphy, B.R., **T.O. Brenden**, and E.M. Hallerman. 2003. Assessment of Virginia's management of riverine muskellunge fisheries. Virginia Department of Game and Inland Fisheries, Federal Aid in Sport Fish Restoration, Project Number F-122-R, Project Completion Report, Richmond, Virginia.

RESEARCH GRANTS AND CONTRACTS

Ongoing Grants

1. Vandergoot, C.S., and **T.O. Brenden**. Spatial and temporal ecology of Lake Erie lake trout. Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$97,706. (Project Years: 2020-2022).
2. **Brenden, T.O.** Simulations to evaluate direct and indirect factors affections the relationship between sea lamprey abundance, lake trout abundance, and lake trout wounding. Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$211,699. (Project Years: 2020-2022).
3. Johnson, N., G. Bravener, F. Neave, B. Morrison, S. Lewandoski, P. Hrodey, M. Symbal, L. Criger, A. Jubar, J. Tews, T. Sullivan, **T. Brenden**, M. Jones, J. Robinson, K. Scribner, and M. Siefkes. Deploy and evaluate sea lamprey controls that supplement lampridices and barriers. Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$1,746,000. (Project Years: 2020-2023).
4. **Brenden, T.O.**, K.F. Robinson, and M.L. Jones. Lake productivity modeling to estimate capacity to support double-crested cormorant predation. Funding Source: USDA Animal and Plant Health Inspection Service via Michigan DNR. Total Award Amount: \$40,000. (Project Years: 2020-2021).
5. **Brenden, T.O.**, K.F. Robinson, and M.L. Jones. Lake productivity modeling to estimate capacity to support double-crested cormorant predation. Funding Source: US Fish and Wildlife Service via Michigan DNR. Total Award Amount: \$70,000. (Project Years: 2020-2021).
6. **Brenden, T.O.**, and S. Valle de Souza. Evaluation of Michigan DNR Lake Huron's Atlantic salmon stocking program. Funding Source: Michigan DNR. Total Award Amount: \$33,000. (Project Years: 2019-2020).
7. **Brenden, T.O.** Lake trout population modeling for Yellowstone Lake. Funding Source: U.S. National Park Service. Total Award Amount: \$48,869. (Project Years: 2018-2023).

8. Loch, T.P., **T.O. Brenden**, and M.P. Ebener. Investigating infectious diseases as a “bottleneck” to lake whitefish (*Coregonus clupeaformis*) recruitment. Great Lakes Fishery Trust. Total Award Amount: \$132,057. (Project Years: 2018-2020).
9. **Brenden, T.O.**, C.S. Vandergoot, and C.C. Krueger. Fine-scale space use of grass carp in Lake Erie and continuing research into grass carp tributary use and large-scale movement through acoustic telemetry. Funding Source: Michigan Department of Natural Resources. Total Award Amount: \$120,000. (Project Years: 2018-2020).
10. Robinson, K, **T. Brenden**, J. Robinson, K. Scribner. Implementing and evaluating grass carp control actions in Lake Erie. Funding Source: Michigan Invasive Species Grant Program. Total Award Amount: \$250,400. (Project Years: 2018-2020).
11. Bence, J., N. Dobiesz, **T. Brenden**, E. Roseman, and J. He. Predator-prey dynamics in the main basin of Lake Huron. Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$298,051. (Project Years: 2017-2020).
12. Faust, M., **T. Brenden**, R. Kraus, S. Ludsin, J. Robinson, C. Vandergoot, and Y. Zhao. Do discrete spawning stock contribute differentially to Lake Erie’s walleye fisheries? Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$273,000. (Project Years: 2017-2020).
13. Johnson, N., **T. Brenden**, J. Barber, L. Walter, K. Tallon, and A. Jubar. Survival and metamorphosis of sea lampreys in Lake Erie tributaries. Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$100,000. (Project Years: 2016-2022).
14. Bence, J.R., **T.O. Brenden**, C.C. Krueger, C.S. Vandergoot, and J.M. Dettmers. Estimating survival of acoustic telemetered walleyes in the Great Lakes and comparisons of survival rates between Lake Huron and Lake Erie spawning populations. Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$149,385. (Project Years: 2014-2020).
15. **Brenden, T.O.**, and J.R. Bence. Harvest policy evaluations for Lake Superior lake trout, Lake Huron lake whitefish, and Lake Erie walleye intermixed fisheries. Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$134,650. (Project Years: 2013-2020).

Completed Research Grants

1. Bence, J.R, and **T.O. Brenden**. Feasibility of rehabilitating and supplementing fisheries by stocking lake whitefish in the upper Great Lakes. Funding Source: Great Lakes Fishery Trust. Total Award Amount: \$19,999.84. (Project Years: 2019).
2. **Brenden, T.O.**, and C.C. Krueger. Tributary use and large-scale movements of grass carps in Lake Erie. Funding Source: Michigan Department of Natural Resources. Total Award Amount: \$116,766. (Project Years: 2014-2018).
3. **Brenden, T.O.** Relative effects of lampricide exposure versus sea lamprey predation on lake sturgeon population viability in the Laurentian Great Lakes. Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$15,000. (Project Years: 2014-2015).
4. **Brenden, T.O.**, and J.R. Bence. Finding appropriate harvest policies for admixed fisheries to ensure long-term population sustainability of native Great Lake fishes. Funding Source: Great Lakes Fishery Trust. Total Award Amount: \$161,239. (Project Years: 2013-2016).
5. Clark, R.D., Jr, J. R. Bence, **T. Brenden**, I. Tsehaye, and R. Claramunt. Determining the fisheries management significance of Chinook salmon movement between lakes Michigan and Huron. Funding Source: Great Lakes Fishery Trust. Total Award Amount: \$270,805. (Project Years: 2013-2017).
6. Faisal, M., and **T. Brenden**. Elucidating the role of herd immunity in protecting Lake Michigan fish against the viral hemorrhagic septicemia virus (VHSV). Funding Source: Great Lakes Fishery Trust. Total Award Amount: \$341,844. (Project Years: 2012-2016).
7. Scribner, K., **T. Brenden**, J. Bence, and W. Stott. Joint analysis of genetic and age data to estimate trends in strain-specific recruitment of emerging wild lake trout populations in Lake Huron. Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$169,890. (Project Years: 2013-2015).
8. Bence, J., S. Winterstein, **T. Brenden**, S. Mayhew, and D. Etter. Statistical catch-at-age assessment of

- Michigan black bear population dynamics. Funding Source: Michigan Department of Natural Resources. Total Award Amount: \$109,231. (Project Years: 2011-2012).
9. Peters, A.K., **T.O. Brenden**, J. Tsao, and M. Faisal. Viral hemorrhagic septicemia: an understanding of the disease ecology and risks in the Great Lakes basin. Funding Source: U.S. Fish and Wildlife Service. Total Award Amount: \$230,724. (Project Years: 2011-2014).
 10. Bence, J.R., and **T.O. Brenden**. Enhancing fishery stock assessment modeling capacity in the Great Lakes. Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$20,812. (Project Years: 2010-2011).
 11. **Brenden, T.O.**, J.R. Bence, and K.T. Scribner. Simultaneous analysis of genetic and age data to estimate stock contribution for mixed-stock and strain, open-water fisheries in the Great Lakes. Funding Source: Great Lakes Fishery Trust. Total Award Amount: \$338,424. (Project Years: 2009-2014).
 12. Infante, D., A. Moerke, C. Huckins, and **T. Brenden**. Effects of temperature on functional relationships among Michigan's fluvial fish assemblages: identifying management opportunities in the face of environmental changes. Funding Source: Michigan Department of Natural Resources. Total Award Amount: \$46,899. (Project Years: 2009-2011).
 13. Jones, M., J. Bence, **T. Brenden**, R. Claramunt, and D. Warner. Assessing Lake Michigan stocking policies using decision analysis. Funding Source: Great Lakes Fishery Trust. Total Award Amount: \$326,139. (Project Years: 2008-2014).
 14. **Brenden, T.O.**, and J. He. Coordination workshops concerning lake trout age-1 mortality in the Great Lakes. Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$8,746. (Project Years: 2008-2010).
 15. Bence, J.R., and **T.O. Brenden**. Estimating the relationship between sea lamprey-induced mortality on lake trout and observed marking rates. Funding Source: Great Lakes Fishery Commission. Total Award Amount: \$36,296. (Project Years: 2007-2008).
 16. Wiley, M.J., C. Riseng, **T.O. Brenden**, L. Wang, E.S. Rutherford, and P.W. Webb. Evaluation and synthesis of methods for identifying and quantifying critical fisheries habitat for Great Lakes lower riverine and nearshore zones. Funding Source: Great Lakes Fishery Trust. Total Award Amount: \$94,631. (Project Years: 2005-2008).
 17. Murphy, B.R., **T.O. Brenden**, and E.M. Hallerman. Assessment of Virginia's management of riverine muskellunge fisheries. Funding Source: Virginia Department of Game and Inland Fisheries. Total Award Amount: \$54,436. (Project Years: 2001-2003).

ADMINISTRATIVE/SERVICE CONTRACTS AND GRANTS RECEIVED

1. Bence, J.R., M.L. Jones, **T.O. Brenden**. 2019. Michigan State University Quantitative Fisheries Center/Great Lakes Fisheries Consulting with Minnesota Department of Natural Resources. Funding Source: Minnesota Department of Natural Resources, Amount: \$16,016. (Project Years: 2019-2020)
2. Bence, J.R., M.L. Jones, **T.O. Brenden**. 2018. Michigan State University Quantitative Fisheries Center/Great Lakes Fisheries Consulting with Minnesota Department of Natural Resources. Funding Source: Minnesota Department of Natural Resources, Amount: \$15,052. (Project Years: 2018-2019)
3. Bence, J.R., M.L. Jones, **T.O. Brenden**. 2017. Michigan State University Quantitative Fisheries Center/Great Lakes Fisheries Consulting with Minnesota Department of Natural Resources. Funding Source: Minnesota Department of Natural Resources, Amount: \$13,503. (Project Years: 2017-2018)
4. Bence, J.R., M.L. Jones, **T.O. Brenden**. 2016. Michigan State University Quantitative Fisheries Center/Great Lakes Fisheries Consulting with Minnesota Department of Natural Resources. Funding Source: Minnesota Department of Natural Resources, Amount: \$13,531. (Project Years: 2016-2017)
5. **Brenden, T.O.**, M.L. Jones, and J.R. Bence. 2016. Great Lakes Fishery Commission Support for the Quantitative Fisheries Center. Funding Source: Great Lakes Fishery Commission, Amount: Up to \$144,395. (Project Years: 2016-2020)
6. Bence, J.R., M.L. Jones, **T.O. Brenden**. 2015. Michigan State University Quantitative Fisheries Center/Great Lakes Fisheries Consulting with Minnesota Department of Natural Resources. Funding Source: Minnesota Department of Natural Resources, Amount: \$11,209. (Project Years: 2015-2016)

7. Bence, J.R., M.L. Jones, **T.O. Brenden**. 2014. Michigan State University Quantitative Fisheries Center/Great Lakes Fisheries Consulting with Minnesota Department of Natural Resources. Funding Source: Minnesota Department of Natural Resources, Amount: \$11,206. (Project Years: 2014-2015)
8. Bence, J.R., M.L. Jones, **T.O. Brenden**. 2014. Michigan State University Quantitative Fisheries Center/Great Lakes Fisheries Consulting with Minnesota Department of Natural Resources. Funding Source: Minnesota Department of Natural Resources, Amount: \$28,572. (Project Years: 2014-2015)
9. Jones, M.L., J.R. Bence, and **T.O. Brenden**. 2013. Research for Management of Inter-Jurisdictional Fisheries Resources. Funding Source: Illinois Department of Natural Resources, Amount: \$8,327 (Project Years: 2013-2014).
10. **Brenden, T.O.**, and J.R. Bence. 2013. Consultation on fisheries management procedures for the Mille Lacs walleye fishery in Minnesota. Funding Source: Minnesota Department of Natural Resources, Amount: \$80,000. (Project Years: 2013-2014)
11. **Brenden, T.O.**, M.L. Jones, and J.R. Bence. 2012. Research for management of inter-jurisdictional fisheries resources. Funding Agency: Illinois Department of Natural Resources, Amount: \$7,969. (Project Years: 2012)
12. **Brenden, T.O.**, M.L. Jones, and J.R. Bence. 2011. Great Lakes Fishery Commission support for the Quantitative Fisheries Center. Funding Source: Great Lakes Fishery Commission, Amount: \$109,417. (Project Years: 2011-2016)
13. **Brenden, T.O.** 2011. Memorandum of understanding between the Chippewa-Ottawa Resource Authority and the Quantitative Fisheries Center for assistance in estimating commercial and survey gillnet catchabilities for cisco in Lake Superior. Funding Source: Chippewa-Ottawa Resource Authority, Amount: \$19,384 (Project Years: 2011-2012)

INSTRUCTION CONTRACTS AND GRANTS RECEIVED

1. Bence, J.R., and **T.O. Brenden**. 2009. Enhancing fishery stock assessment modeling capacity in the Great Lakes. Funding Source: Great Lakes Fishery Commission, Amount: \$20,812. (Project Years: 2009-2011)
2. **Brenden, T.O.**, J.R. Bence, and M.J. Jones. 2007. Development of an on-line course on resampling approaches to data analysis in natural resource sciences and an on-line module for data simulation and resampling programming using Microsoft Excel VBA. Funding Source: Michigan State University Graduate School, Amount: \$40,000. (Project Years: 2007-2019)

SYMPOSIUM/CONFERENCE PRESENTATIONS

(*Presenter; †= Indicates graduate student I supervised; ‡=Indicates research associate I supervised; †= Indicates graduate student on whose committee I served)

1. **Brenden***, **T.O.**, and J.R. Bence. 2019. A combined Lakes Michigan and Huron statistical catch-at-age model for Chinook salmon. Invited Presentation: 2019 State of Lake Huron Conference, Saginaw, Michigan.
2. Zink*†, M., **T.O. Brenden**, S. Valle de Souza, R. Claramunt, T. Cwalinski. 2019. Lake Huron Atlantic salmon population assessment and economic valuation. Invited Presentation: 2019 State of Lake Huron Conference, Saginaw, Michigan.
3. Fitzpatrick*, K., B. Weidel, M. Connerton, J. Lantry, M. Yuille, S. LaPan, **T. Brenden**, and S. Sethi. 2019. Predator-prey population dynamics modeling for Chinook salmon and alewife in Lake Ontario. Oral Presentation: 2019 IAGLR Conference, Brockport, New York.
4. Nathan*, L., K. Robinson, J. Boase, **T. Brenden**, J. Buszkiewicz, M. DuFour, J. Francis, S. Herbst, P. Kocovsky, J. Robinson, K. Scribner, S. Thomas, and R. Young. 2019. Implementation of grass carp adaptive management response actions in Lake Erie. Oral Presentation: 2019 IAGLR Conference, Brockport, New York.
5. **Brenden***, **T.O.**, C. Harris, C. Krueger, C. Vandergoot, M. Faust, and S. Herbst. 2019. Telemetry research to inform grass carp risk & control in Lake Erie. Invited Presentation: 2019 Lake Committee Meetings Common Session, Ypsilanti, Michigan.

6. Harris[†], C., **T. Brenden***, C. Krueger, C. Vandergoot, M. Faust, and S. Herbst. 2019. Modeling grass carp movements in the Sandusky River to inform control efforts. Oral Presentation: 2019 Great Lakes Acoustic Telemetry Observation System Annual Coordination Meeting, Ann Arbor, Michigan.
7. Harrison*, C.E., **T.O. Brenden**, M.P. Ebener, C.K. Knupp, M.R. Gunn Van Deuren, M.A. Shavaliar, and T.P. Loch. 2019. Investigating infectious diseases as a “bottleneck” to lake whitefish recruitment. Oral Presentation: 2019 Department of Fisheries and Wildlife Graduate Student Organization Research Symposium, East Lansing, Michigan.
8. Knupp*, C.K., M. Faisal, **T. Brenden**, and T.P. Loch. 2019. Elucidating the intraspecific diversity of *Flavobacterium psychrophilum*, causative agent of bacterial coldwater disease, in the USA. Oral Presentation: 2019 Department of Fisheries and Wildlife Graduate Student Organization Research Symposium, East Lansing, Michigan.
9. Nathan*, L., J. Boase, **T. Brenden**, J. Buszkiewicz, M. DuFour, J. Francis, S. Herbst, P. Kocovsky, J. Robinson, S. Thomas, and K. Robinson. 2019. Adaptive management of Lake Erie grass carp: reducing uncertainties while implementing response strategies. Oral Presentation: 2019 Michigan Chapter of the American Fisheries Society Annual Meeting, Gaylord, Michigan.
10. Woodard, G., **T. Brenden**, and W. Mattes. 2019. Diet analysis of Lake Superior lake whitefish. Oral Presentation: 2019 Michigan Chapter of the American Fisheries Society Annual Meeting, Gaylord, Michigan.
11. **Brenden*, T.O.**, I. Tsehaye, J.R. Bence, J. Kanefsky, and K.T. Scribner. 2018. Indexing recruitment for source populations contributing to mixed fisheries by incorporating age in genetic stock identification models. Invited Presentation: 2018 AFS Annual Meeting, Atlantic City, New Jersey.
12. Harris, C.*[†], **T. Brenden**, S. Herbst, C. Vandergoot, M. Faust, and C. C. Krueger. 2018. Lake Erie grass carp movement and tributary use. Oral Presentation: 2018 IAGLR Conference, Scarborough, Ontario.
13. Hunter*[‡], R.D., N. Sard, K. T. Scribner, D. Hayes, **T. Brenden**, R. DeBruyne, E. F. Roseman. 2018. Genetic Pedigree Analysis And Species Richness Estimators Allow Estimation Of The Total Number Of Spawning Adults Contributing Offspring. Oral Presentation: 2018 AFS Annual Meeting, Atlantic City, New Jersey.
14. Li[‡], Y., J.R. Bence, and **T.O. Brenden***. 2018. Can spawning origin information of catch or a recruitment penalty improve assessment and fishery management performance for a spatially structured stock assessment model? Invited Presentation: 2018 AFS Annual Meeting, Atlantic City, New Jersey.
15. Scribner*, K.T., **T.O. Brenden**, I. Tsehaye[‡], J.R. Bence, W. Stott, and J. Kanefsky. 2018. Hatchery strain contributions to emerging wild lake trout populations in Lake Huron. Invited Presentation: 2018 AFS Annual Meeting, Atlantic City, New Jersey.
16. Vincent**[†], M.T., **T.O. Brenden**, and J.R. Bence. 2018. Simulation analysis of a spatially explicit tag-integrated catch-at-age model that estimates natural mortality and reporting rate and application to Lake Erie walleye. Oral Presentation: 2018 CAPAM workshop on spatial stock assessment models, La Jolla, California.
17. **Brenden*, T.**, L. Ivan[‡], I. Standish[‡], and M. Faisal. 2017. Can stocking vaccinated fish protect a Great Lakes fish population from disease? Oral Presentation: 2017 AFS Fish Health Section Annual Meeting, East Lansing, Michigan.
18. Dennhardt*, A., B. Maurer, W. Fetzer, J. Bence, **T. Brenden**, A. Cottrill, D. McLeish, C. Riseng, K. Wehrly, and D. Forsyth. 2017. Spatiotemporal factors and their impacts to Lake Huron fish communities. Oral Presentation: 2017 IAGLR Conference, Detroit, Michigan.
19. Harris**[†], C., **T. Brenden**, C. Krueger, S. Herbst, and C. Vandergoot. 2017. Tributary use and large-scale movement of grass carp: patterns to inform control effort in western Lake Erie. Oral Presentation: 2017 International Conference on Aquatic Invasive Species, Fort Lauderdale, Florida.
20. Harris**[†], C., **T. Brenden**, C. Krueger, S. Herbst, and C. Vandergoot. 2017. Tributary use and large-scale movement of grass carp in western Lake Erie. Oral Presentation: 2017 IAGLR Conference, Detroit, Michigan.

21. Herbst*, S., N.D. Popoff, T. Newcomb, J. Francis, R. Carter, J. Navarro, M. Jones, K. Robinson, **T.O. Brenden**, A. Mahon, K. Pangle, and J. Tyson. 2017. Multi-jurisdictional collaborations and structured approach for grass carp control in Lake Erie. Oral Presentation: 2017 International Conference on Aquatic Invasive Species, Fort Lauderdale, Florida.
22. Ivan**‡, L., **T. Brenden**, M. Faisal, and I. Standish. 2017. Can stocking vaccinated fish protect a Great Lakes fish population from infectious diseases? Oral Presentation: 2017 IAGLR Conference, Detroit, Michigan.
23. Li*‡, Y. J.R. Bence, and **T.O. Brenden**. 2017. Using information on source population composition of the catch in a spatially structured stock assessment to improve assessment and fishery management performance. Oral Presentation: 2017 ICES Annual Science Conference, Fort Lauderdale, Florida.
24. Li*‡, Y. J.R. Bence, and **T.O. Brenden**. 2017. A comprehensive framework for modeling spatial tag-recovery data with different movement assumptions. Oral Presentation: 2017 IAGLR Conference, Detroit, Michigan.
25. Scribner*, K.T., I. Tsehaye‡, **T.O. Brenden**, W. Stott, and J.R. Bence. 2017. Hatchery strain contributions to emerging wild lake trout populations in Lake Huron. Oral Presentation: 2017 IAGLR Conference, Detroit, Michigan.
26. Vincent**†, M.T., **T.O. Brenden**, and J.R. Bence. 2017. Analysis of a four region tag-integrated catch-at-age model that estimates natural mortality. Oral Presentation: 2017 IAGLR Conference, Detroit, Michigan.
27. Li‡, Y., J.R. Bence, **T. O. Brenden**, and M.T. Vincent**†. 2016. Simulation-based evaluation of assessment approaches for intermixing fish populations. Invited Presentation: 2016 AFS Annual Meeting, Kansas City, Missouri.
28. Vincent**†, M., **T. Brenden**, and J. Bence. 2016. Simulation testing a multi-region tag-integrated assessment model. Oral Presentation: 2016 Department of Fisheries and Wildlife Graduate Student Organization Research Symposium, East Lansing, Michigan.
29. Newcomb, T., R. Carter, **T. Brenden**, J. Francis, S. Herbst, C. Harris†, S. Huff, J. Navarro, N. Popoff*, and J. Tyson. 2016. Grass carp and neighborly relations in Lake Erie. Invited Presentation: 2016 AFS Annual Meeting, Kansas City, Missouri.
30. Vandergoot, C.*, M. Faust, R. Kraus, **T. Brenden**, S. Cooke, and C. Krueger. 2016. Traditional considerations for contemporary tagging studies: factors influencing acoustic telemetry recaptures and recoveries when estimating mortality components. Oral Presentation: 2016 AFS Annual Meeting, Kansas City, Missouri.
31. **Brenden***, **T.O.**, I. Tsehaye‡, J.R. Bence, W. Liu, J. Kanefsky, and K.T. Scribner. 2016. Indexing recruitment fluctuations for populations contributing to mixtures by simultaneous analysis of age and genetic information. Invited Presentation: 2016 Midwest Fish and Wildlife Conference, Grand Rapids, MI.
32. Dennhardt*, A., J. Bence, **T. Brenden**, B. Maurer, W. Fetzer, C. Riseng, K. Wehrly, and D. Forsyth. 2016. Assessing factors influencing population dynamics in Lake Huron fish communities using dynamic factor analysis. Oral Presentation: 2016 Midwest Fish and Wildlife Conference, Grand Rapids, MI.
33. Harris**†, C., **T. Brenden**, S. Herbst, C. Vandergoot, and C. Krueger. 2016. Tributary use and large-scale movement of grass carp: patterns to inform control efforts in western Lake Erie. Invited Presentation: 2016 Midwest Fish and Wildlife Conference, Grand Rapids, MI.
34. Ivan**‡, L., **T. Brenden**, M. Faisal, and I. Standish‡. 2016. Can vaccinated hatchery fish be used to prevent disease spread? A case study of VHS IVb. Oral Presentation: 2016 Midwest Fish and Wildlife Conference, Grand Rapids, MI.
35. Vandergoot*, C., M. Faust, **T. Brenden**, R. Kraus, J. Gostiaux, C. Krueger, and S. Cooke. 2016. Traditional considerations for contemporary tags: factors influencing acoustic telemetry recaptures and recoveries when estimating mortality components. Oral Presentation: 2016 Lake Erie – Inland Waters Annual Research Review, Columbus, OH.

36. Bence*, J.R., and **T.O. Brenden***. 2015. Mille Lacs Lake Walleye blue ribbon panel data review and recommendations for future data collection and management. Tuesday Inter-Lab Quantitative Seminar, East Lansing, MI.
37. **Brenden***, **T.O.**, C. Krueger, C. Harris[†], and C. Vandergoot. 2015. Tributary use and large scale movements of grass carp in Lake Erie. 2015 Great Lakes Panel on Aquatic Nuisance Species, Ann Arbor, MI.
38. Harris*[†], C., **T. Brenden**, C. Krueger, and C. Vandergoot. 2015. Tributary use and large-scale movements of grass carps in Lake Erie. 2015 Great Lakes Acoustic Telemetry Observation System Coordination Meeting, Ann Arbor, MI.
39. Rutherford*, E., R. Sturtevant, N. Mandrak, A. Thompson, A. Kramer, M. Wittmann, P. Kocovsky, H. Embke, C. Mayer, S. Qian, **T. Brenden**, C. Krueger, C. Harris[†], and C. Vandergoot. 2015. Grass carp habitat suitability, establishment and spread in the Huron-Erie Corridor. State of the Strait: Coordinating Conservation in the St. Clair-Detroit River System, Windsor, ON.
40. Scribner, K., **T. Brenden***, I. Tsehaye[‡], J. Bence, W. Stott, and J. Kanefsky, J. 2015. Hatchery strain contributions to emerging wild lake trout populations in Lake Huron. Tuesday Inter-Lab Quantitative Seminar, East Lansing, MI.
41. Tsehaye*, I., **T.O. Brenden**, J.R. Bence, K.T. Scribner, and J. Kanefsky. 2015. Combining genetics with age/length data to estimate consistent changes in year-class strength of spawning populations contributing to admixtures, with application to Lake Michigan lake sturgeon. Oral Presentation: 2015 North American Sturgeon and Paddlefish Society Annual Meeting, Oshkosh, Wisconsin.
42. Vincent*[†], M., **T.O. Brenden**, and J.R. Bence. 2015. Simulation analysis of tag-integrated catch-at-age models. Oral Presentation: 2015 AFS Annual Meeting, Portland, Oregon.
43. Bence*, J.R., N.E. Dobiesz, **T.O. Brenden**, and J.X. He. 2014. Using a stochastic model to evaluate the past and future role of predators in changes to Lake Huron's main basin fish community. Invited Presentation: 2014 IAGLR Annual Meeting, Hamilton, Ontario.
44. **Brenden***, **T.O.**, M.L. Jones, and B.J. Irwin. 2014. Re-examination of sea lamprey control policies for the St. Marys River through simulation analysis. Oral Presentation: 2014 Michigan Chapter of the American Fisheries Society Annual Meeting, Holland, Michigan.
45. **Brenden***, **T.O.**, I. Tsehaye[‡], J.R. Bence, and K.T. Scribner. 2014. Simultaneous analysis of genetic and length data to estimate changes in year-class strength of Lake Michigan lake sturgeon. Oral Presentation: 2014 AFS Annual Meeting, Quebec City, Quebec.
46. Li*, Y., J.R. Bence, and **T.O. Brenden**. 2014. Sensitivity of fishery management performance to alternative frequencies of stock assessments. Oral Presentation: 2014 AFS Annual Meeting, Quebec City, Quebec.
47. Maurer*, B.A., J.R. Bence, and **T.O. Brenden**. 2014. Non-equilibrium dynamics of near shore fish communities in Lake Huron. Oral Presentation: 2014 ESA Annual Meeting, Sacramento, California.
48. Millard*, E., J. Sikarskie, **T. Brenden**, and H. Barron. 2014. Prognostic factors in brevetoxicosis in double-crested cormorants and brown pelicans. Poster Presentation: 2014 College of Veterinary Medicine Phi Zeta Research Days, East Lansing, Michigan.
49. Reilly*[‡], R., **T. Brenden**, and G. Whelan. 2014. Evaluation of long-term phosphorous monitoring in Platte Lake. Oral Presentation: 2014 Michigan Chapter of the American Fisheries Society Annual Meeting, Holland, Michigan.
50. Vandergoot*[†], C.S., and **T.O. Brenden**. 2014. Spatially-varying population demographics and fishery characteristics of Lake Erie walleye (*Sander vitreus*) inferred from a long-term tag-recovery study. Oral Presentation: 2014 AFS Annual Meeting, Quebec City, Quebec.
51. Kraus*, R.T., C. Vandergoot, A. Cook, **T.O. Brenden**, M.W. Rogers, and P. Kocovsky. 2013. Reconciling inter-agency differences in stock assessment inputs from multiple fishery independent gillnet surveys. Oral Presentation: 2013 AFS Annual Meeting, Little Rock, Arkansas.
52. Li*, Y., J.R. Bence, and **T.O. Brenden**. 2013. Modeling intermixing lake whitefish populations: a simulation study to evaluate alternative stock assessment methods. Oral Presentation: World Conference on Stock Assessment Methods, Boston, Massachusetts.

53. Li, Y., J.R. Bence*, and **T.O. Brenden**. 2013. Relative influence on assessment frequency and assessment model structure of fishery management performance. Oral Presentation: World Conference on Stock Assessment Methods, Boston, Massachusetts.
54. Bence*, J.R., **T.O. Brenden**, and J.E. Johnson. 2013. Sensitivity of Chinook salmon stock assessment in Lake Huron to assumed wild recruitment. Invited Presentation: 2013 IAGLR Annual Meeting, West Lafayette, Indiana.
55. **Brenden***, **T.O.**, I. Tsehaye, J.R. Bence, and M.L. Jones. 2013. Comparison of Chinook salmon population demographics and fishery characteristics among lakes Michigan, Huron, and Ontario inferred from SCAA assessment models. Invited Presentation: 2013 IAGLR Annual Meeting, West Lafayette, Indiana.
56. **Brenden***, **T.O.** 2013. Walleye selectivity evaluations for two gillnet configurations in Lake Erie and the overall accuracy of the SELECT approach for estimating selectivity. Graduate Research Organization Seminar Series, Michigan State University, East Lansing.
57. Li*, Y., J.R. Bence, and **T.O. Brenden**. 2013. Evaluating fishery assessment approaches for intermixing lake whitefish populations. Oral Presentation: 2013 Department of Fisheries and Wildlife Graduate Student Organization Research Symposium, East Lansing, Michigan.
58. Li*, Y., J.R. Bence, and **T.O. Brenden**. 2013. Addressing intermixing of lake whitefish populations comparing fishery management and assessment performance based on alternative assessment approaches. Oral Presentation: 2013 Canadian Conference for Fisheries Research, Windsor, Ontario.
59. Throckmorton*[‡], E., A. Peters, M. Faisal, and **T. Brenden**. 2013. Disease ecology of viral hemorrhagic septicemia (VHSV) in an inland Michigan lake. Oral Presentation: 2013 Department of Fisheries and Wildlife Graduate Student Organization Research Symposium, East Lansing, Michigan.
60. Tsehaye*, I., M.L. Jones, **T.O. Brenden**, J.R. Bence, and R.M. Claramunt. 2013. Changes in the salmonine community of Lake Michigan and their implications for predator-prey balance. Invited Presentation: 2013 IAGLR Annual Meeting, West Lafayette, Indiana.
61. Vandergoot*[†], C.S., and **T.O. Brenden**. 2013. Spatially varying population demographics and fishery characteristics of Lake Erie walleye estimated from a long-term tag-recovery study. Oral Presentation: 2013 Department of Fisheries and Wildlife Graduate Student Organization Research Symposium, East Lansing, Michigan.
62. Williams*[‡], M., M. Jones, **T. Brenden**, and C. Murphy. 2013. Spatial, temporal, and cohort-related patterns in the contribution of wild Chinook salmon to total Chinook harvest in Lake Michigan. Invited Presentation: 2013 IAGLR Annual Meeting, West Lafayette, Indiana.
63. Williams*[‡], M., M. Jones, **T. Brenden**, and C. Murphy. 2013. Spatial, temporal, and cohort-related patterns in the contribution of wild Chinook salmon to total Chinook harvest in Lake Michigan. Oral Presentation: 2013 Michigan Chapter of the American Fisheries Society Annual Meeting, Gaylord, Michigan.
64. Vandergoot*[†], C.S., and **T.O. Brenden**. 2013. Spatially varying population demographics and fishery characteristics of Lake Erie walleye estimated from a long-term tag-recovery study. Oral Presentation: 2013 Canadian Conference for Fisheries Research, Windsor, Ontario.
65. **Brenden***, **T.**, W. Liu, J. Bence, and K. Scribner. 2012. Simultaneous analysis of genetic and age data to estimate spawning population contribution to admixed fisheries in the Great Lakes. Invited Presentation: 2012 AFS Annual Meeting, Minneapolis, Minnesota.
66. Throckmorton*[‡], E., A. Peters, M. Faisal, and **T. Brenden**. 2012. Disease ecology of viral hemorrhagic septicemia in an inland Michigan lake. Oral Presentation: 2012 AFS Annual Meeting, Minneapolis, Minnesota.
67. Vandergoot*[†], C.S., **T.O. Brenden**, M.V. Thomas, D.W. Einhouse, H.A. Cook, and M.W. Turner. 2012. Estimation of tag shedding and reporting rates for Lake Erie jaw tagged walleyes. Oral Presentation: 2012 AFS Annual Meeting, Minneapolis, Minnesota.
68. **Brenden***, **T.**, W. Liu, J. Bence, and K. Scribner. 2012. Simultaneous analysis of genetic and age/length data to estimate spawning population contribution to mixed-stock or strain, open water

- fisheries in the Great Lakes. Oral Presentation: Lake Huron Technical Committee Meeting, Port Huron, Michigan.
69. **Brenden*, T.O.** 2011. Stock intermixing in the Great Lakes: challenges and solutions for fisheries management. Invited Presentation: College of Marine Science, Shanghai Ocean University.
 70. **Brenden*, T.O.**, and J.R. Bence. 2011. Model-based evaluation of how stocking *Oncorhynchus* influences the fish community of lakes Huron and Ontario. Invited Presentation: 2011 AFS Annual Meeting, Seattle, Washington.
 71. Molton*[†], K., **T. Brenden**, and J. Bence. 2011. Stock intermixing and harvest policy performance for lake whitefish in the upper Great Lakes. Oral Presentation: 2011 Department of Fisheries and Wildlife Graduate Student Organization Research Symposium, East Lansing, Michigan.
 72. Molton*[†], K., **T. Brenden**, and J. Bence. 2011. Influences of stock intermixing and productivity on harvest policy performance: a simulation-based evaluation of lake whitefish management in the upper Great Lakes. Oral Presentation: 2011 AFS Annual Meeting, Seattle, Washington.
 73. Newcomb*, T., **T. Brenden**, R. Brown, M. Ebener, and K. Reid. 2011. Great Lakes commercial fisheries: historical overview and prognoses for the future. Invited Presentation: 2011 AFS Annual Meeting, Seattle, Washington.
 74. Thornbrugh*, D.J., D.M. Infante, and **T.O. Brenden**. 2011. Effects of temperature on functional relationships among Michigan's fluvial fish assemblages. Oral Presentation: 2011 Department of Fisheries and Wildlife Graduate Student Organization Research Symposium, East Lansing, Michigan.
 75. Wang*, L., Y. Cao, and **T. Brenden**. 2011. Validation of river valley segments delineated for bioassessment and fisheries management using fish assemblages. Poster Presentation: 2011 AFS Annual Meeting, Seattle, Washington.
 76. Molton*[†], K., **T. Brenden**, and J. Bence. 2011. Assessing the effects of stock intermixing on harvest policy performance for lake whitefish in the Upper Great Lakes. Oral Presentation: 2011 Michigan AFS Annual Meeting, Petoskey, Michigan.
 77. Vandergoot*[†], C.S., **T.O. Brenden**, P. Kocovsky, and W. Liu. 2010. Comparison of biological characteristics and mortality rates of walleye captured in two different types of experimental gill nets in Lake Erie. Oral Presentation: Annual Ohio State University and Ohio Division of Wildlife Research Review Meeting, Columbus, Ohio.
 78. **Brenden*, T.O.**, and J.R. Bence. 2010. Population dynamics of Lake Ontario lake trout during 1985-2007. Oral Presentation: Lake Ontario Sea Lamprey Damage Analysis Workgroup, Picton, Ontario.
 79. **Brenden*, T.O.**, and J.R. Bence. 2010. A model-based evaluation of how stocking *Oncorhynchus* influences the fish community of Lake Huron. Oral Presentation: Lake Huron Technical Committee Meeting, Port Huron, Michigan.
 80. **Brenden*, T.O.**, and J.R. Bence. 2009. Influence of *Oncorhynchus* stocking on fish communities in lakes Huron and Ontario. Oral Presentation: Council of Lake Committees Bi-Annual Meeting, Romulus, Michigan.
 81. **Brenden*, T.O.**, and J.R. Bence. 2009. Influence of *Oncorhynchus* stocking on fish communities in lakes Huron and Ontario. Oral Presentation: Michigan DNR Fisheries Division, Research Section Annual Meeting, Roscommon, Michigan.
 82. Vandergoot*[†], C., **T. Brenden**, P. Kocovsky, and W. Liu. 2009. Comparison of biological characteristics and mortality rates of walleye captured in two different types of experimental gill nets in Lake Erie. Oral Presentation: 2009 AFS Annual Meeting, Nashville, Tennessee.
 83. **Brenden*, T.O.**, and J.R. Bence. 2009. Update on the Lake Huron salmonid stocking decision analysis project. Oral Presentation: Lake Huron Technical Committee Bi-Annual Meeting, Sault Ste. Marie, Michigan.
 84. **Brenden, T.O.**, L. Wang, and P. Seelbach*. 2009. An ecological river segment classification of Michigan rivers based on statistical analyses of fish and physical attributes. Oral Presentation: 2009 North American Benthological Society Annual Meeting, Grand Rapids, Michigan.
 85. **Brenden*, T.O.** 2009. Statistical considerations for implementing marking projects. Oral Presentation: Lake Ontario Mass Marking and Tagging Workshop, Pulaski, New York.

86. **Brenden*, T.O.**, M.L. Jones, and M. Ebener. 2008. Sensitivity of tag recovery mortality estimates to tag shedding, handling mortality, and reporting rate inaccuracies. Oral Presentation: 2008 AFS Annual Meeting, Ottawa, Ontario.
87. Wagner*, T., M.L. Jones, M.P. Ebener, M.P. Arts, **T.O. Brenden**, D.C. Honeyfield, G.M. Wright, and M. Faisal, M. 2008. Spatial and temporal dynamics of lake whitefish health indicators: linking individual-based indicators to a management-relevant endpoint. 2008 Midwest Fisheries and Wildlife Conference, Columbus, Ohio.
88. Wang, L.* , J. Stewart, P. Seelbach, and **T. Brenden**. 2007. Landscape based identification of human disturbance gradients and references for streams in Michigan and Wisconsin. Oral Presentation: 2007 AFS Annual Meeting, San Francisco, California.
89. Wang, L.* , J. Stewart, P. Seelbach, and **T. Brenden**. 2007. A multi-state stream network classification and database for bioassessment and aquatic resources management. Oral Presentation: 2007 AFS Annual Meeting, San Francisco, California.
90. Benbow, M.* , T. Wagner, **T. Brenden**, and 13 others. 2007. New frontiers into the ecology of Buruli ulcer disease – an update on using satellite imagery to quantify landscape-ecology linkages with disease occurrence in West Africa. World Health Organization: Annual meeting of the Global Buruli Ulcer Initiative.
91. McKenna, J.E.* , C. Castiglione, J. Stewart, J. Schaeffer, and **T. Brenden**. 2007. Great Lakes basin scale-dependent aquatic habitat classification guided by biotic distributions. Oral Presentation: 2007 International Association of Great Lake Research Conference, University Park, Pennsylvania.
92. **Brenden, T.O.**, L. Wang*, R. Clark, Jr. P.W. Seelbach, and M.J. Wiley. 2006. Ecological stream segment identification for digital river networks. Oral Presentation: 2006 Michigan AFS Annual Meeting, East Lansing, Michigan.
93. **Brenden*, T.O.**, L. Wang, R. Clark, Jr. P.W. Seelbach, and M.J. Wiley. 2005. Ecological stream segment identification for digital river networks. Oral Presentation: 2005 Midwest Fish and Wildlife Conference, Grand Rapids, Michigan.
94. **Brenden*, T.O.**, E.M. Hallerman, B.R. Murphy, J. R. Copeland, and J. A. Williams. 2005. The New River, Virginia, muskellunge fishery: population dynamics, harvest regulation modeling, and angler attitudes. Dr. E. J. Crossman International Muskie Symposium, Indianapolis, Indiana.
95. **Brenden*, T.O.**, L. Wang, R. Clark, Jr. P.W. Seelbach, and M.J. Wiley. 2005. A clustering algorithm for ecological stream segment identification from spatially extensive digital databases. Oral Presentation: 2005 Annual Meeting of the North American Benthological Society, New Orleans, Louisiana.
96. **Brenden, T.O.**, L. Wang*, R. Clark, Jr. P.W. Seelbach, and M.J. Wiley. 2005. A clustering algorithm for ecological stream segment identification from spatially extensive digital databases. Oral Presentation: 2005 International Association of Great Lake Research Conference, Ann Arbor, Michigan.
97. **Brenden, T.O.**, L. Wang*, R. Clark, Jr. P.W. Seelbach, and M.J. Wiley. 2005. A variable selection process for identification of ecological stream segments. Oral Presentation: 2005 International Association of Great Lake Research Conference, Ann Arbor, Michigan.
98. **Brenden*, T.O.**, B.R. Murphy, and E.M. Hallerman. 2004. Predatory impact of muskellunge on New River, Virginia, smallmouth bass. Oral Presentation: 2004 Southeastern Association of Fish and Wildlife Agencies, Hilton Head, South Carolina.
99. **Brenden*, T.O.**, B.R. Murphy, and E.M. Hallerman. 2003. Modeling habitat use and the effect of alternative harvest regulations on the New River muskellunge fishery. Oral Presentation: 2003 AFS Virginia-Virginia Tech Joint Meeting, Blacksburg, Virginia.
100. **Brenden*, T.O.**, B.R. Murphy, and E.M. Hallerman. 2003. Modeling the effect of alternative harvest regulations on the New River muskellunge fishery. Oral Presentation: 2003 AFS Southern Division Spring Meeting, Wilmington, North Carolina.
101. **Brenden*, T.O.**, B.R. Murphy, and J.B. Birch. 2003. Statistical properties of the relative weight (W_r) index and an alternative procedure for testing W_r differences between groups. Poster Presentation: 2003 AFS Southern Division Spring Meeting, Wilmington, North Carolina.

102. **Brenden*, T.O.**, B.R. Murphy, and E.M. Hallerman. 2002. Habitat influence on the spatio-temporal distribution of muskellunge in a 17-km reach of the New River, VA. Oral Presentation: 2002 AFS Annual Meeting, Baltimore, Maryland.
103. **Brenden*, T.O.**, S.D. Klopfer, and B.R. Murphy. 1999. GutChek 2.0: software for computing diet-breadth and overlap indices. Poster Presentation: The 4th Microcomputer Applications in Fish and Wildlife Conference, Lake Tahoe, Nevada.
104. **Brenden*, T.O.**, and B.R. Murphy. 1999. Competition between largemouth bass and bluegill and its implications for management of small impoundments. Oral Presentation: 1999 AFS Annual Meeting, Charlotte, North Carolina.
105. **Brenden*, T. O.**, and B. R. Murphy. 1999. Trophic interactions of age-0 largemouth bass and juvenile bluegill. Oral Presentation: Southern Division AFS Mid-Year Meeting, Chattanooga, Tennessee.
106. **Brenden*, T.O.**, and B.R. Murphy. 1999. Competitive interactions between age-0 largemouth bass and juvenile bluegill. Oral Presentation: Virginia - North Carolina Joint AFS Meeting, Dansville, Virginia.

TEACHING

Classroom Teaching (Instructor of Record)

- Resampling Data Analyses for Ecologists (Graduate Seminar), Michigan State University
- Statistical Methods in Ecology and Evolution, Michigan State University
- Fisheries Management, Virginia Polytechnic Institute and State University
- Fisheries Techniques, Virginia Polytechnic Institute and State University
- Statistical Issues in Fisheries and Wildlife Sciences (Graduate Seminar), Virginia Polytechnic Institute and State University
- Introduction to Renewable Natural Resources, Virginia Polytechnic Institute and State University

Classroom Teaching (Guest Lecture)

- Fish Population Dynamics, Michigan State University
- Landscape Ecology, Michigan State University
- Population Analysis and Management, Michigan State University
- Fisheries Techniques, Virginia Polytechnic Institute and State University
- Ichthyology, Virginia Polytechnic Institute and State University

Classroom Teaching (Teaching Assistant)

- Statistics for Engineering Applications, Virginia Polytechnic Institute and State University
- Ichthyology, Virginia Polytechnic Institute and State University
- Fisheries Management, Virginia Polytechnic Institute and State University
- Principles of Fisheries and Wildlife Management, Virginia Polytechnic Institute and State University
- Introduction to Renewable Natural Resources, Virginia Polytechnic Institute and State University

Short Course/Workshop Instruction

- Age and Growth Analyses with R (Workshop at 2017 American Fisheries Society Annual Meeting in Tampa, Florida)
- Basics of Statistically-Based Stock Assessments (Short Course at Michigan State University)
- Introduction to AD Model Builder (Short Course at Michigan State University)
- Introduction to R (Short Course at Shanghai Ocean University)
- Introduction to R for Fisheries Scientists (Workshop at 2014 American Fisheries Society Annual Meeting in Quebec City, Quebec)
- Resampling Approaches to Data Analysis in Natural Resources and Ecology (Center for Statistical Training and Consulting Workshop at Michigan State University)

Online Course Instruction/Moderator

- Resampling Approaches to Data Analysis in Natural Resources and Ecology
- R Essentials for Natural Resource Professionals
- Maximum Likelihood Estimation for Natural Resources and Ecology

GRADUATE/UNDERGRADUATE/POST-DOCS SUPERVISED AS MAJOR PROFESSOR

Student	Degree	Years	Title/Topic
Faust, Matt	PhD	2019-present	Lake Erie walleye fishery-independent survey evaluation and strategies for incorporating survey data in assessment models
Fischer, Jason	Post-Doc	2019-2020	Grass carp movement and spatial ecology in Lake Erie
Harris, Cleyo	MS	2015-2020	Grass carp movement and space use in Lake Erie: implications for management efforts
Ivan, Lori	Post-Doc	2014-2017	Individual-based model evaluation of using vaccinated hatchery fish to minimize disease spread in wild fish populations
Ivan, Lori	Post-Doc	2019	Individual-based model assessing hatchery operations
Lewandoski, Sean	PhD	2020-present	Evaluation of supplemental control techniques for reducing sea lamprey densities in the Great Lakes
Molton, Kyle	MS	2009-2011	Keeping up with the times: Are more conservative control rules needed to protect intermixing lake whitefish populations?
Tsehaye, Iyob	Post-Doc	2013-2015	Simultaneous analysis of genetic and age data to estimate stock contribution for mixed-stock and strain, open-water fisheries in the Great Lakes
Vandergoot, Chris	PhD	2008-2014	Estimation of regional mortality rates for Lake Erie walleye <i>Sander vitreus</i> using spatial tag-recovery modeling.
Vincent, Matt	PhD	2013-2017	Simulation analyses of integrated tagging and catch-at-age analysis models and application to Lake Erie walleye.
Woodard, Grant	UG	2018-present	Lake Superior lake whitefish diet analysis
Zink, Matt	MS	2019-present	Assessment of Lake Huron Atlantic salmon stocking program

The graduate students and post-doctoral research associates I have supervised and that have graduated or separated from MSU are all gainfully employed in the Fisheries Science field. Dr. Lori Ivan is a **Post-Doctoral Research Associate** at Michigan State University. Kyle Molton is a **Fisheries Management Specialist** with the National Marine Fisheries Service. Dr. Iyob Tsehaye is a **Quantitative Fisheries Scientist** with the Wisconsin Department of Natural Resources. Dr. Chris Vandergoot is a **Fixed-Term Associate Professor** and **Director** of the Great Lakes Acoustic Telemetry Observation System at Michigan State University. Dr. Matt Vincent is a **Stock Assessment Scientist** with the Secretariat of the Pacific Community.

SERVICE ON GRADUATE STUDENT COMMITTEES

Student	Degree	Year Graduated	MSU Dept.	Title/Topic
Alger, Brett	MS	2009	Fisheries & Wildlife	Measuring anthropogenic disturbances in a hydrogeomorphic-based lake classification built using fish assemblages in 360 north-temperate lakes
Cooper, Arthur	MS	2013	Fisheries & Wildlife	Effects of dams on streams of the conterminous united states: characterizing patterns in habitat

				fragmentation nationally and fluvial fish response in the Midwest
Fisch, Nick	MS	2017	Fisheries & Wildlife	On the assessment and sustainability of Thunder Bay cisco
Flinn, Shane	PhD	Enrolled	Fisheries & Wildlife	Consequences and tradeoffs of methods of enhancing connectivity of migratory fishes in the Great Lakes
Harrison, Courtney	MS	Enrolled	Fisheries & Wildlife	Infectious diseases as a “bottleneck” to lake whitefish recruitment
Holbrook, Chris	PhD	2015	Fisheries & Wildlife	Dynamics of sea lamprey spawning migrations in large rivers, with application to population assessment and control in the Great Lakes
Hunter, Rob	MS	2018	Fisheries & Wildlife	Assessing reproductive success of lake sturgeon associated with natural and constructed spawning reefs in a large river system using pedigree analysis
Jensen, Alex	MS	2017	Fisheries & Wildlife	Modeling the impacts of barrier removal on Great Lakes sea lamprey
Knupp, Chris	MS	2018	Fisheries & Wildlife	Detection of novel multilocus sequence typing genotypes of <i>Flavobacterium psychrophilum</i> in North America
Knupp, Chris	PhD	Enrolled	Fisheries & Wildlife	Intraspecific diversity of <i>Flavobacterium psychrophilum</i> and its pathogenic effects on US aquaculture/hatchery conditions
Li, Yang	PhD	2018	Fisheries & Wildlife	Innovative stock assessment methods and management solutions for spatially structured fish populations
Liljestrand, Emily	PhD	Enrolled	Fisheries & Wildlife	Dynamics and application of stock assessment and population models
Loch, Tom	PhD	2012	Pathobiology & Diagnostic Invest.	Identification of novel flavobacteria from Michigan and assessment of their impacts on fish health
Millard, Elena	PhD	2013	Pathobiology & Diagnostic Invest.	Humoral immune response of Great Lakes fishes to viral hemorrhagic septicemia virus genotype IVb
Peterson, Lisa	PhD	Enrolled	Fisheries & Wildlife	Estimating survival of acoustic telemetered walleyes in the Great Lakes and comparison of survival rates between Lake Huron and Lake Erie spawning populations
Riedy, Joseph	PhD	Enrolled	Integrative Biology	Ecological and conservation implications of the factors affecting larval lake sturgeon survival
Schulz, Carolyn	PhD	2014	Fisheries & Wildlife	Factors and pitfalls influencing the detection of bacterial kidney disease
Standish, Isaac	PhD	2016	Pathobiology & Diagnostic Invest.	Eliciting protection and herd immunity in fish against viral hemorrhagic septicemia virus genotype IVb
Throckmorton, Elizabeth	MS	2013	Fisheries & Wildlife	Investigations into the disease ecology of viral hemorrhagic septicemia virus (VHSV) genotype IVb in Budd lake, Michigan

Williams, Mart	MS	2012	Fisheries and Wildlife	Spatial, temporal, and cohort-related patterns in the contribution of wild chinook salmon to total chinook harvest in Lake Michigan
Ziegenmyer, Heidi	MS	2011	Fisheries & Wildlife	Effects of spring angling, habitat features, and guarding male attributes on largemouth bass nest survival and implications for fall young-of-year abundance

UNIVERSITY, COLLEGE, AND DEPARTMENT SERVICE

Standing committees

- Member (elected), Michigan State University Academic Integrity Hearing Board (2017 – present)

Ad-hoc committees

- Member (appointed), Michigan State University Department of Fisheries and Wildlife Mentoring Committee (2012)
- Member (appointed), Michigan State University Department of Fisheries and Wildlife Re-Appointment, Promotion, and Tenure Policy Review Committee (2012 – 2013)

PROFESSIONAL SERVICE

- Member, SupCon Working Group of the Sea Lamprey Control Board (2019 – present)
- Member, U.S. National Park Service Lake Trout Suppression in Yellowstone Lake Science Review Panel (2017 – present)
- Member, FishLamp Working Group of the Sea Lamprey Control Board (2016 – present)
- Technical Advisor, Great Lakes Fishery Commission Fish Health Committee (2014 – present)
- Member, Great Lakes Fishery Commission Sea Lamprey Larval Assessment Task Force (2012 – present)
- Symposium Co-organizer, 2018 American Fisheries Society Annual Meeting, “Integration of Genetic Techniques with Quantitative Stock Assessment and Ecological Models for Resolving Fishery Management Issues” (2018)
- Assessment Team Member, Great Lake Fishery Commission Selective Fish Passage Work Group (2016-2018)
- Program Co-Chair/Steering Committee Member, 2016 Midwest Fish and Wildlife Conference, Grand Rapids, Michigan (2014 – 2016)
- Member, Blue Ribbon Panel tasked with examining available data, evaluating past harvest policies, and recommending future data collection, research, and management for Minnesota Mille Lacs Lake walleye population (2014-2015)
- Member, AFS Publications Awards Subcommittee, North American Journal of Fisheries Management (2013-2014)
- Organizer, “Early mortality of lake trout in the Great Lakes” workshops (2008 – 2010)

EDITORIAL SERVICE

- Guest Subject Matter Editor *Ecological Applications* (2015)
- Associate Editor *Transactions of the American Fisheries Society* (2012-2013)
- Guest Editor *Journal of Great Lakes Research* Special Issue on “Assessing the Health of Lake Whitefish Populations in the Laurentian Great Lakes (2008-2010)

REVIEWS: MANUSCRIPTS, BOOK CHAPTERS, PROPOSALS

Manuscripts

- Biological Invasions
- Canadian Journal of Fisheries and Aquatic Sciences
- Ecological Applications
- Ecology

- Environmental and Ecological Statistics
- Environmental Management
- Environmental Modelling and Software
- Fish and Fisheries
- Fisheries
- Fisheries Management and Ecology
- Fisheries Research
- Hydrobiologia
- Journal of Fish Biology
- Journal of Fisheries and Wildlife Management
- Journal of Great Lakes Research
- Limnology and Oceanography
- Marine Ecology Progress Series
- North American Journal of Fisheries Management
- Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies
- Proceedings of the 13th International Coregonid Symposium
- River Research and Applications
- Transactions of the American Fisheries Society

Book Chapters

- Advances in Fish Tagging and Marking Technology, Editors: McKenzie et al.; Publisher: American Fisheries Society; Year Published: 2012
- Balancing Fisheries Management and Water Uses for Impounded River Systems, Editors: Allen et al.; Publisher: American Fisheries Society; Year Published: 2009
- Landscape Influences on Stream Habitats and Biological Assemblages, Editors: Hughes et al.; Publisher: American Fisheries Society; Year Published 2006

Technical Reports

- Status of Walleye in the Great Lakes: Proceedings of the 2006 Symposium (Technical Report 69); Editors: Roseman et al.; Publisher: Great Lakes Fishery Commission; Year Published: 2010

Proposals

- Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative
- Great Lakes Fishery Trust
- Maryland Sea Grant College Program

Proposal Review Panels

- National Sea Grant Highly Migratory Species Research Initiative (2019)
- Wisconsin Sea Grant College Program (2017)