



Great Lakes Fishery Commission Pulse on Science: Deliverables Spring 2021

This bi-annual newsletter lists titles and abstracts for recently completed, Commission-funded research projects and links to associated media coverage and publications. Questions about any of the research below? Contact research@glfc.org.

Science Transfer Program:

A Changing Lake Huron (Implications of Lower Trophic Level Changes for Fishery Managers)

Stewart, T.

November 2020

Products (all Science Transfer Program products can be downloaded and used freely from <http://www.glfc.org/science-transfer-toolkit.php>):

- Fact sheet: http://www.glfc.org/pubs/pdfs/research/A_Changing_Lake_Huron.pdf
- Slide deck: http://www.glfc.org/pubs/pdfs/research/A_Changing_Lake_Huron-presentation.pptx
- Pulse on Science: Project Spotlight article: <http://www.glfc.org/pulse-on-science.php>

Fishery Research Program:

Energy and Nutrient Dynamics of Great Lakes Food Webs

Transcriptomic analysis of *Mysis diluviana* vertical migration

Wargo, M.

October 2020

Abstract: http://www.glfc.org/pubs/pdfs/research/reports/2019_WAR_440840.pdf

Re-establishment of Native Deep-water Fishes

Post-stocking behaviour, habitat use, and survival of hatchery-reared native fishes using acoustic telemetry

Johnson, T.

February 2021

Abstract: http://www.glfc.org/pubs/pdfs/research/reports/2017_JOH_44065.pdf

Products:

- Klinard, N.V., Halfyard, E.A., Fisk, A.T., Stewart, T.J., and Johnson, T.B. 2018. Effects of surgically implanted acoustic tags on laboratory body condition, growth, and survival in a small laterally compressed forage fish. *Trans. Amer. Fish. Soc.* 147: 749-757. <https://doi.org/10.1002/tafs.10064>
- Klinard, N.V., J.K. Matley, A.T. Fisk, T.B. Johnson. 2019a. Long-term retention of acoustic telemetry transmitters in temperate predators revealed by predation tags

- implanted in wild prey fish. *J. Fish. Biol.* 95: 1512-1516.
<https://doi.org/10.1111/jfb.14156>
- Klinard, N. V., E. A. Halfyard, J. K. Matley, A. T. Fisk, T. B. Johnson. 2019b. The influence of dynamic environmental interactions on detection efficiency of acoustic transmitters in a large, deep, freshwater lake. *Anim. Biotelemetry* 7: 17 DOI: 10.1186/s40317-019-0179-1. <https://doi.org/10.1186/s40317-019-0179-1>
 - Klinard, N.V., J. K. Matley, E. A. Halfyard, M. Connerton, T. B. Johnson, A. T. Fisk. 2020a. Post-stocking movement and survival of hatchery-reared bloater (*Coregonus hoyi*) reintroduced to Lake Ontario. *Freshwat. Biol.* 65(6): 1073-1085.
<https://doi.org/10.1111/fwb.13491>
 - Klinard, N. V., J. K. Matley, S. V. Ivanova, S. M. Larocque, A. T. Fisk, T. B. Johnson. 2020b. Application of machine learning to identify predators of stocked fish in Lake Ontario: using acoustic telemetry predation tags to inform management. *J. Fish. Biol.* (accepted October 1, 2020). <https://doi.org/10.1111/jfb.14574>
 - Ashworth, E.C., N. Benoit, K. Bowen, M. Connerton, J. Holden, K. Holeck, B. Weidel and T.B. Johnson. Interannual variability in spatial patterns of environmental resources in eastern Lake Ontario – considerations for bloater restoration. *J. Great Lakes Res.* (in prep)

Sea Lamprey Research Program:

Assessment

Determine what fishes adult sea lamprey parasitized by barcoding DNA in their feces

Johnson, N.

December 2020

Abstract: http://www.glfrc.org/pubs/pdfs/research/reports/2018_JOH_54076.htm

Barriers and Trapping

Exploiting the unexploited: A smart panel system for in-situ detection of adult sea lamprey

Tan, X.

December 2020

Abstract: http://www.glfrc.org/pubs/pdfs/research/reports/2018_TAN_54069.pdf

Products:

- H. Shi, M. Al-Rubaii, C. M. Holbrook, J. Miao, T. Pinto, C. Wang, and X. Tan, “Screen-printed soft capacitive sensors for spatial mapping of both positive and negative pressures,” *Advanced Functional Materials*, vol. 29, no. 3, p. 1809116 (10 pp), 2019.
<https://doi.org/10.1002/adfm.201809116>
- “E-skin technology could aid in sea lamprey fight,” *IJC Great Lakes Connection*, January 2020 issue, 2020. <https://ijc.org/en/e-skin-technology-could-aid-sea-lamprey-fight>
- “Smart skin’ for sea lamprey detection,” *Lakes Letter*, Fall 2019 issue, 2019.
http://iaglr.org/ll/2019-3-Fall_LL3.pdf

Other recent publications from previously-funded GLFC projects (SLRP)*

*This list may not be all-inclusive

- Dinehart, S., and Hubert, T.D. 2020. Investigation on endocrine disruption of the larval lampricide 3-trifluoromethyl-4-nitrophenol: short-term reproduction assay with fathead minnow (*Pimephales promelas*). *Environmental Toxicology and Chemistry* 39, 1599-1607. <https://doi.org/10.1002/etc.4751>
- Ellis, E., R. Frederiksen, A. Morshedjian, G.L. Fain, and A.P. Sampath. 2020. Separate ON and OFF pathways in vertebrate vision first arose during the Cambrian. *Current Biology*. 30:R633-R634. <https://doi.org/10.1016/j.cub.2020.04.032>
- Fisette, S. D., Bussy, U., Huerta, B., Buchinger, T. J., & Li, W. (2020). Evidence that male sea lamprey increase pheromone release after perceiving a competitor. *Journal of Experimental Biology*. <https://doi.org/10.1242/jeb.226647>
- Hepditch, S., Birceanu, O., and Wilkie, M.P. In Press. A toxic unit and additive index approach to understanding the interactions of two piscicides, TFM and niclosamide, in rainbow trout. *Environmental toxicology and chemistry*. DOI:10.1002/etc.4994. Published: 2021-Jan-28 (Epub 2021 Jan 28) <https://doi.org/10.1002/etc.4994>
- Lennox, R.J., Bravener, G.A., Lin, H.Y., Madenjian, C.P., Muir, A.M., Remucal, C.K., Robinson, K.F., Rous, A.M., Siefkes, M.J., Wilkie, M.P., Zielinski, D.P., Cooke, S.J. 2020. Potential changes to the biology and challenges to the management of invasive sea lamprey *Petromyzon marinus* in the Laurentian Great Lakes due to climate change. *Global Change Biology Glob Change Biol*. 2020; 00:1–20. <https://doi.org/10.1111/gcb.14957>
- Miehls S, Dawson HA, Maguffee AC, Johnson NS, Jones ML, and Dobiesz N. 2020. Where you trap matters: implications for integrated sea lamprey management. *J. Great Lakes Res. Sea Lamprey International Symposium III. Special Volume*. <https://www.sciencedirect.com/science/article/pii/S0380133020301453>
- Zhang Z, Gao X, Zhang Q, Li W. 2020. Constitutive activity of a spermine receptor is maintained by a single site in the C-terminal. *Biochemical and Biophysical Research Communications*. <https://doi.org/10.1016/j.bbrc.2020.03.053>
- Zhang Z, Zhang Q, Dexheimer TS, Ren J, Neubig RR, Li W. 2020. Two highly related odorant receptors specifically detect α -bile acid pheromones in sea lamprey (*Petromyzon marinus*). *Journal of Biological Chemistry*, 295(34), 12153-12166. <https://doi.org/10.1074/jbc.RA119.011532>
- Zielinski, D. P., S. Miehl, G. Burns & C. Coutant (2020) Adult sea lamprey respond to induced turbulence in a low current system, *Journal of Ecohydraulics*, <https://doi.org/10.1080/24705357.2020.1775504>

Zielinski, Daniel P, Robert L McLaughlin, Thomas C Pratt, R Andrew Goodwin, Andrew M Muir, Single-Stream Recycling Inspires Selective Fish Passage Solutions for the Connectivity Conundrum in Aquatic Ecosystems, *BioScience*, Volume 70:871–886. <https://doi.org/10.1093/biosci/biaa090>

Other recent publications from previously-funded GLFC projects (FRP)*

*This list may not be all-inclusive

Dippold, D.A., Aloysius, N., Keitzer, S.C., Yen, H., Arnold, J.G., Daggupati, P., Fraker, M.E., Martin, J.F., Robertson, D.M., Sowa, S.P., Johnson, M.V., White, M.J. Ludsin, S.A. 2020. Forecasting the combined effects of anticipated climate change and agricultural conservation practices on fish recruitment dynamics in Lake Erie. *Freshwater Biology* 2020(65), 1487-1508. <https://doi.org/10.1111/fwb.13515>

Dippold, D.A., Adams, G.D., & Ludsin, S.A. 2020. Spatial patterning of walleye recreational harvest in Lake Erie: Role of demographic and environmental factors. *Fisheries Research*, 230(2020), 105676. <https://doi.org/10.1016/j.fishres.2020.105676>

Fraker, M.E., Keitzer, S.C., Sinclair, J.S., Aloysius, N.R. Dippold, D.A., Haw, Y., Arnold, J.G., Daggupati, P., Johnson, M.V., Martin, J.F., Robertson, D.M., Sowa, S.P., White, M.J., & Ludsin, S.A. 2020. Projecting the effects of agricultural conservation practices on stream fish communities in a changing climate. *Science of the Total Environment* 747(2020) 14112. <https://doi.org/10.1016/j.scitotenv.2020.141112>

Griffin, J.E., O'Malley, B.P., & Stockwell, J.D. 2020. The freshwater mysid *Mysis diluviana* (Audzijonyte & Väinölä, 2005) (Mysida: Mysidae) consumes detritus in the presence of *Daphnia* (Cladocera: Daphniidae). *Journal of Crustacean Biology*, 2020, 1-6. <https://doi.org/10.1093/jcbiol/ruaa053>

Smith, S.R., Amish, S.J., Bernatchez, L., Le Luyer, J., Wilson, C.C., Boeberitz, O., Luikart, G., & Scribner, K.T. 2020. Mapping of adaptive traits enabled by a high-density linkage map for Lake Trout. *G3: Genes, Genomes, Genetics* 10(6), 1929-1947. <https://doi.org/10.1534/g3.120.401184>

Stockwell, J. D., O'malley, B.P., Hansson, S., Chapina, R.J., Rudstam, L. G., & Weidel, B.C. 2020. Benthic Habitat is an integral part of freshwater Mysis ecology. *Freshwater Biology* 2020(00), 1-13 <https://doi.org/10.1111/fwb.13594>