

**Sabbatical Report – Ashley H. Moerke**  
**2014/2015**

**Title:** Understanding Aquatic Ecosystem Linkages in the Great Lakes Basin: Enhancing LSSU's Research Capacity and Collaborations

## **I. Project Description**

### ***Background***

From 2011-2014, I worked with collaborators on a three-year study (>\$300,000 in funding to LSSU) to evaluate the influence of river inputs on nearshore productivity in the Great Lakes. I also was a co-PI on a 5-year project that is developing biological indicators of ecosystem health for Great Lakes coastal wetlands. This latter project is a Great Lakes-wide collaboration with scientists at over eight institutions and agencies, and was the largest Great Lakes Restoration Initiative project funded to date (\$10 million; ~\$300,000 to LSSU). Fieldwork for both projects was completed in 2014 and data analysis and publication preparation began in winter 2014/2015.

My 2014-2015 sabbatical allowed me the opportunity to focus on completing research products (presentations and publications), build collaborative networks, develop new research proposals, and update my knowledge base and skillset in aquatic ecology. In addition, I spent significant time meeting with legislators, lobbyists, and LSSU supporters to advance the Center for Freshwater Research and Education (CFRE) project. The time spent towards CFRE was not originally part of my sabbatical proposal, but timing was as such that it was important for me to focus my efforts on CFRE to move the project forward.

I also would like to increase my professional network by building new collaborations and avenues for future research. To do this, Dr. Pete McIntyre and his colleagues at the Center for Limnology (UW-Madison) have agreed to host me for a 2-3 month visit. Dr. McIntyre is not currently a collaborator on a funded project, but our research interests align closely and we are interested in developing proposals for future research. While at UW-Madison, Dr. McIntyre and I will explore opportunities to integrate our data that addresses aquatic ecosystem linkages questions. Specifically, we will propose further research on linkages between Great Lakes tributaries and nearshore areas/bays and the importance of these linkages for maintaining diversity and productivity in both ecosystems, as well as being an avenue for non-native species and contaminant dispersal.

### ***Sabbatical Outcomes***

#### **1. Publications**

- a. Collins, S, B. Marshall\*, and A. Moerke. 2016. Aerial insect responses to non-native Chinook salmon spawning in a Great Lakes tributary. *Journal of Great Lakes Research* 42(3):630-636.
- b. Gerig, B., D. Chaloner, D. Janetski, R. Rediske, J. O'Keefe, A. Moerke, and G. Lamberti. 2016. Congener patterns of persistent organic pollutants reveal Pacific salmon contaminant delivery to Great Lakes tributaries. *Environmental Science & Technology* 50(2): 554-563.
- c. Moerke, A., C. Ruetz, C. Pringle, and T. Simon. In Press. Chapter 19: Macroconsumer-resource interactions *in* R. Hauer and G. Lamberti, editors.

- Methods in Stream Ecology, 3<sup>rd</sup> Edition, Academic Press, CA.
- d. Uzarski, D.G., V.J. Brady, M.J. Cooper, D.A. Wilcox, D. Albert, R. Axler, P. Bostwick, T. Brown, J. Ciborowski, N. Danz, J. Gathman, T. Gehring, G. Grabas, A. Garwood, R. Howe, L. Johnson, G. Lamberti, A. Moerke, B. Murry, G. Niemi, C. Norment, C. Ruetz, A. Steinman, D. Tozer, R. Wheeler, T. K. O'Donnell, and J.P. Schneider. Standardized measures of coastal wetland condition: implementation at a Laurentian Great Lakes basin-wide scale. *Wetlands*. Submitted and is currently in revision stage.
  - e. Cooper, M.J., G.A. Lamberti, A.H. Moerke, C.R. Ruetz III, D.A. Wilcox, V.J. Brady, T.N. Brown, J.H. Ciborowski, J.P. Gathman, G. Grabas, L.B. Johnson, and D.G. Uzarski. In Review. An expanded fish-based index of biotic integrity for Great Lakes coastal wetlands. Submitted to *Wetlands*
  - f. Kirby, F.\*, T. Wills, A. Nuhfer, and A. Moerke. Submitted. Colonization of a brook trout (*Salvelinus fontinalis*) stream by introduced brown trout (*Salmo trutta*) in Hunt Creek, MI. *North American Journal of Fisheries Management*
2. Presentations during Sabbatical year (\*undergraduate)
- a. Moerke, A., M. Elya\*, B. Gerig, D. Chaloner, M. Brueseke, and G. Lamberti. Potential for contrasting nutrient subsidies to Great Lakes tributaries by native and non-native migratory fishes. Society for Freshwater Sciences, May 2015, Milwaukee, WI (poster)
  - b. Moerke, A., P. McIntyre, E. Childress, and S. David. Spatiotemporal variability in spring spawning dynamics of northern Lake Michigan migratory fishes. American Fisheries Society, Aug 2015, Portland, OR (talk)
  - c. Moerke, A., P. McIntyre, E. Childress, and S. David. Spatiotemporal variability in spawning phenology of Lake Michigan migratory fishes. University of Wisconsin Center for Limnology seminar series, March 2015 (invited talk)
  - d. Sleight, N.\*, Z. Berry\*, and A. Moerke. Baseline bioassessment of the St. Marys River Little Rapids Area (Michigan). Midwest Fish & Wildlife, Feb. 2015, Indianapolis, IN (talk)
  - e. Moerke, A., K. Arend, D. Mockler\*, G. Steinhart, P. Ripple, and F. Zomer. Influence of low-order tributary inputs on the nearshore dynamics of Whitefish Bay, Lake Superior. Society for Freshwater Science, May 2016, Sacramento, CA (poster).
  - f. Chaloner, D.T., B.S. Gerig, D.J. Janetski, P. Levi, A. Moerke, R. Rediske, J. Ruegg, J.L. Tank, S.D. Tiegs, and G.A. Lamberti. The effects of Pacific salmon spawners on stream ecosystems: why context matters. Society for Freshwater Science, May 2016, Sacramento CA (talk)
  - g. Dutton, A.\* and A. Moerke. Changes in terrestrial invertebrate subsidies and Rainbow Trout diets following a wildfire. Midwest Fish & Wildlife Conference, Feb. 2015, Indianapolis, IN
  - h. Sleight, N.\*, Z. Berry\*, and A. Moerke. Baseline bioassessment of the St. Marys River Little Rapids Area (Michigan). Midwest Fish & Wildlife Conference, Feb. 2015, Indianapolis, IN (talk)
  - i. Dutton, A.\* and A. Moerke. Changes in terrestrial invertebrate subsidies and Rainbow Trout diets following a wildfire. MI American Fisheries Society annual meeting, Jan. 2015, Bay City, MI (Talk – awarded **Best Student Presentation**)
  - j. Hiltz, D.\* and A. Moerke. Changes in fish populations after barrier removal on Thompson Creek, MI. MI American Fisheries Society annual meeting, Jan. 2015, Bay City, MI (Poster)

- k. Roznowski, T.\* and A. *Moerke*. Substrate selection for crypsis by case-building caddisfly (Trichoptera) larvae. MI American Fisheries Society annual meeting, Jan. 2015, Bay City, MI (Poster – **awarded Best Student Poster**)
- 3. Presentations after Sabbatical year, but as a result of new collaborations
  - a. \*Frey, R., D. Chaloner, M. Leevy, and A. *Moerke*. Developing a new methodology to detect microplastics in aquatic organisms. Midwest Fish and Wildlife Conference, Jan. 2016, Grand Rapids, MI (poster)
  - b. \*Milan, J., F. Zomer, K. Kapuscinski, P. Ripple, and A. *Moerke*. Seasonal fish migration dynamics in three Lake Superior tributaries. Midwest Fish and Wildlife Conference, Jan. 2016, Grand Rapids, MI (poster)
  - c. *Moerke*, A. and M. Vinson. Potential climate change impacts on Lake Superior fishes. Superior Challenge Summer, University of Michigan CILER, May 2016 (Invited talk)
- 4. Proposals submitted during sabbatical year
  - a. US Environmental Protection Agency, Great Lakes Restoration Initiative. GLIC Implementing Great Lakes coastal wetland monitoring. Co-PIs: Don Uzarski (lead) and 9 others; 2016-2020, \$10,000,000 (\$233,432 to Moerke). FUNDED
  - b. Michigan Department of Environmental Quality. Aquatic Invasive Species Pilot Studies in Michigan: *Myriophyllum spicatum* and *Didymosphenia geminata*. PI: A. Moerke; 2015-2016, \$115,000. FUNDED
  - c. US Bureau of Indian Affairs, Great Lakes Restoration Initiative. Temporal and spatial variation in fish spawning migrations and condition in tributaries of Whitefish Bay (Lake Superior). Co-PIs: P. Ripple and K. Kapuscinski, 2015-2016, \$80,030. FUNDED
  - d. Water quality assessment using advanced technology to improve adaptive management for sustainable water levels. Great Lakes Protection Fund. Co-PI: Michael Twiss (Clarkson University); \$80,000. NOT FUNDED
  - e. Expansion of study abroad opportunities at LSSU. Fund for LSSU. \$2800. FUNDED (\$1000).
- 5. Proposals submitted after sabbatical year, but as a result of collaborations developed during sabbatical
  - a. Lake Superior Long-Term-Ecological Research Network. National Science Foundation – collaborator with P. McIntyre (UW-Wisconsin) and R. Sterner (UM-Duluth). IN REVIEW
- 6. Research Meetings and Collaborations
  - a. Spent 1 week at the University of Notre Dame drafting publications and proposals
  - b. Spent 2 months at UW-Madison’s Center for Limnology
    - i. Attended Dr. Pete McIntyre’s weekly lab meetings
    - ii. Attended weekly research seminars at the center
    - iii. Gave a lecture in Fish Ecology course at UW-Madison
    - iv. Collaborated with Dr. McIntyre’s post-docs and graduate students on related research projects
- 7. Other
  - a. Traveled with Dr. Eric Simon’s class from New England College to Belize and participated in their Marine Biology class. This allowed me to understand the logistical issues associated with teaching a course in this region and refine ideas for a course offering at LSSU. As a result, I offered a study abroad course the following Fall (2016) and it filled (see blog on [www.amoerke.weebly.com](http://www.amoerke.weebly.com)).
  - b. CFRE Project
    - i. Presented CFRE project to Infrastructure Committee

- ii. Completed and submitted Capital Outlay application for CFRE in 2014 and 2015.
- iii. Helped organize and participate in multiple legislative visits
- iv. Participated in biweekly ARL/CFRE meetings
  - v. Prepared and submitted GLFT grant proposal to extend grant commitment
- vi. Met multiple times with the City of SSM to discuss NRTF Grant submission
- vii. Coordinated and led tours of the proposed CFRE site to city and county officials, legislators, and friends of LSSU
- viii. Helped draft and interview for Campaign Coordinator position
- ix. Worked with Geometriks to update CFRE video/animation