

Upper Midwest Environmental Sciences Center June 2011 Activity Report

Aquatic Ecosystem Health

Presentations

- Mark Gaikowski (UMESC) gave the presentation, “Bacterial Disease in Warmwater Fish: New Strategies for Sustainable Control,” at the [World Aquaculture Society](#) meeting, June 6-10 in Natal, Brazil. Key points raised included: Tissue depletion studies indicate that levels of florfenicol amine (*the marker residue of florfenicol*) in tilapia that receive feed medicated with Aquaflor are below the concentration safe for human consumption 11 days after the cessation of treatment; the decline of florfenicol amine in tilapia in a recirculating aquaculture system is similar to that found in tilapia dosed with florfenicol in continuous-flow systems; and, based on daily measurements of nitrite and ammonia, administering Aquaflor did not alter biofilter denitrification (*the biological conversion of ammonia and nitrite [compounds toxic to fish] to nitrate*).

Project Updates

- Mark Gaikowski, Jeff Meinertz (UMESC), Richard Kiesling (MN WSC), Heiko Schoenfuss (St. Cloud State University), and Kim Fredricks (Viterbo University) initiated, “Phase II of the Vulnerability of Lakes to Endocrine Disruption Project,” at the Upper Midwest Environmental Sciences Center in La Crosse, WI, June 13. The project is a joint research effort focused on juvenile and adult fish vulnerability to Endocrine-Active Contaminants (EAC) found in Minnesota lakes. The project is funded by a grant from the Minnesota Environmental Trust Fund to the Minnesota Water Science Center in Mounds View, MN. Research this summer focuses on juvenile and adult life-history stages of bluegill, sunfish, and fathead minnows.
- A cooperative study between UMESC and the U.S. Fish and Wildlife Service (FWS) Genoa National Fish Hatchery was conducted to determine lake sturgeon egg development at four different water temperature ranges, to determine neural tube formation (*i.e., safe shipment time*), time from spawn to hatch in hours, and hours until supplemental feeding. An index of development stages at different temperatures will be used as a guide for Fisheries offices and other organizations in the future to further success of lake sturgeon restoration efforts and to evaluate naturally occurring development according to temperature in the wild. The resulting index may be used as an explanation for success of hatch in wild populations of lake sturgeon and to evaluate population changes.

Aquatic Invasive Species – Sea Lamprey

Lampricide Registration

- The role of UMESC, as the authorized company agent for the FWS in matters related to the federal registration of the lampricides 3-trifluoromethyl-4-nitrophenol (TFM) and niclosamide in the United States and Canada, was recently expanded to include state pesticide reporting requirements for Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. The FWS serves as the registrant for six TFM and niclosamide formulations sponsored by the Great Lakes Fishery Commission (GLFC) Integrated Management of Sea Lamprey (*Petromyzon marinus*) Control Program.

Quality Assurance

- Jane Rivera (UMESC) provided quality assurance oversight for sea lamprey pheromone research at the USGS Hammond Bay Biological Station, Millersburg, MI, June 28-30. Field work and data collection for several projects were evaluated for conformance with federal regulations governing U.S. Environmental Protection Agency (EPA) experimental use permits.

Support for this work is provided through a collaborative agreement between the GLFC and the Upper Midwest Environmental Sciences Center.

Aquatic Invasive Species – Asian Carp

Meetings

- Mark Gaikowski, Terry Hubert and Mike Jawson (*UMESC*) briefed the FWS's National Aquatic Invasive Species Coordinator and Midwest Region 3 Fisheries staff on the potential use of targeted delivery systems to deliver biocides to control filter feeding aquatic invasive species including zebra and quagga mussels and bighead and silver carp, June 23, Minneapolis, MN. The briefing focused on recent USGS research by Jon Amberg and Jim Luoma on differences in particle selection and filtration rates and digestive enzymes between native and non-native filter feeders and on strategies to register these systems with the EPA to allow their use to control aquatic invasive species. This research is made possible through funding provided by USGS (*base and science support proposals*) and the Great Lakes Restoration Initiative (GLRI).

Aquatic Invasive Species – Zebra and Quagga Mussels

Publications

- Teresa Newton (*UMESC*) co-authored a paper on using fatty acids for tracking the dietary contribution of mollusks in food web and contaminant-fate studies. By using unusual fatty acids (*polymethylene-interrupted fatty acids, PMI-FAs*), the scientists were able to partition Great Lakes' mussels into three separate groups (*zebra, quagga, and native mussels*). The preliminary synoptic survey suggests that PMI-FAs appear to have most, if not all, of the hallmarks of a good biochemical tracer in they (a) are metabolically relatively stable and apparently non-harmful to the organisms that harbor them, (b) originate from a unique source, and (c) can be readily identified and quantified as they are transferred from one trophic level to the next. The PMI-FAs appear to be a promising biomarker for mussel carbon in the Great Lakes and, presumably, in other aquatic ecosystems.
 - Mezek, T., E. Sverko, M.D. Rudy, D. Zaruk, A. Capretta, C.E. Hebert, A.T. Fisk, D.J. McGoldrick, T.J. Newton, T.M. Sutton, M.A. Koops, A.M. Muir, T.B. Johnson, M.P. Ebener, and M.T. Arts. 2011. [Polymethylene-interrupted fatty acids: Biomarkers for native and exotic mussels in the Laurentian Great Lakes](#). *Journal of Great Lakes Research*. Vol 37 p. 289-297.

Climate Change

Wisconsin

- Barry Johnson (*UMESC*) attended the Advisory Committee meeting for the Wisconsin Initiative on Climate Change Impacts (WICCI) in Madison, WI, June 15. The Committee addressed work currently underway to produce down-scaled climate projections for the Great Lakes and Upper Mississippi River basins, major new topic areas for addressing the effects of climate change, and the role of the WICCI Science Council and working groups over the next few years.

Endangered Species

Golden-cheeked Warbler

- Wayne Thogmartin (*UMESC*) is serving as an expert panelist in a Wildlife Society-led review of the conservation-related science associated with the federally listed Golden-cheeked Warbler. The review will provide critical feedback to the FWS regarding the state of knowledge pertaining to this endangered species.

Great Lakes Restoration Initiative (GLRI)

Project #80, Birds as Indicators of Contaminant Exposure

- Chris and Tom Custer (*UMESC*) gave a presentation on GLRI Project 80 to the Wyandotte Rotary, Wyandotte, MI, June 28. In 2010 and 2011 the City of Wyandotte allowed USGS to use the Wyandotte Golf Course as a study site for Project 80. The golf course is constructed atop a brownfield adjacent to the Detroit River.
- Fieldwork for GLRI project #80 drew to a close towards the end of June. Sampling was successful at the 32 study sites on Lakes Superior, Michigan, Huron, and Erie.

Project #82, Characterization of Rivermouth Ecosystems: Foodweb Linkages Among Watersheds, Wetlands, and Lakes Supporting Great Lakes Fisheries

- John (JC) Nelson (*UMESC*) attended the [2011 International Association for Great Lakes Research](#) (IAGLR) meeting in Duluth, MN May 31-June 2. Nelson is working on a GLRI project that is presenting several talks at the meetings, and plans to learn about other GIS projects underway in the Great Lakes region. Presentations included:
 - Relationships between Watershed Characteristics and Food Web Structure in Lake Michigan Rivermouth Ecosystems, by Larson, J.H., W.B. Richardson, J.M. Vallazza, and J.C. Nelson.
- Brent Knights, Jason Veldboom and Ben Uphoff (*UMESC*) sampled the Cheboygan, Ocqueoc, and Tahquamenon Rivers in Michigan as part of an extensive effort to characterize and understand the broad spatial patterns in ecology and dynamics of Great Lakes rivermouth ecosystems, June 13-18. A total of thirty other rivermouth ecosystems will be sampled extensively this summer throughout the Laurentian Great Lakes basin. Landscape characteristics of surrounding catchments will be used to determine how land cover and land use impact rivermouth organisms and supporting foodwebs and potentially Great Lakes fisheries.

Mississippi River

Fishers and Farmers Partnership

- Jason Rohweder (*UMESC*) gave the WebEx presentation, “Exploring relationships among land ownership, agricultural land use, and native fish species richness in the Upper Mississippi River Basin,” to members of the National Fish Habitat Action Plan Scientific Advisory Network, June 1. The presentation covered methodologies used by Nathan DeJager and Jason Rohweder for the [Fishers and Farmers Partnership for the Upper Mississippi River Basin](#), and their potential for use by other Midwestern fish habitat partnerships.
- Ken Lubinski (*UMESC*) presented an update on recent Upper Mississippi River Basin stream assessment analyses and discussed the development of the stream monitoring strategy at the Fishers and Farmers Partnership Steering Committee meeting, June 27-28, near St. Peter, MN. Lubinski is the Partnership’s Science Team Lead; the steering committee is also composed of individuals from the Partnership’s Communications and Project Planning Teams. The meeting ended with a tour of Seven Mile Creek (*one of the Partnership’s restoration projects*) and a low-key media event at which the Partnership’s Charter became active. The Fishers and Farmers Partnership is a partnership of the National Fish Habitat Action Plan.

Long Term Resource Monitoring Program

- UMESC staff, Marvin Hubbell, and Karen Hagerty (*U.S. Army Corps of Engineers*), held a meeting to discuss the future direction of the Upper Mississippi River System’s Environmental Management Program and Long Term Resource Program (LTRMP), and efforts to incorporate more science and adaptive management into LTRMP monitoring and restoration projects, June 1-2 in La Crosse, WI.

- Nathan De Jager and Yao Yin (*UMESC*) published a manuscript on a study of changes in spatial patterns of submerged macrophytes in response to the cumulative effects of management actions and regional environmental changes.
 - DeJager, N.R., Y. Yin. 2010. Temporal changes in spatial patterns of submersed macrophytes in two impounded reaches of the Upper Mississippi River, USA, 1998–2009. *River Syst.* Vol. 19/2, p. 129–141.

Resource Mapping

- Larry Robinson (*UMESC*) performed digital image processing of heron rookeries located on the Upper Mississippi River between Navigation Pools 5 through 14 (*natural color at 3"/pixel*) and of aerial imagery for an invasive species study on sites in Navigation Pools 8, 9, and 13 (*color infrared at 6"/pixel*).

National Park Mapping

Cuyahoga Valley National Park (CUVA)

- Erin Hoy, Kevin Hop, Andrew Strassman (*UMESC*), Jim Drake (*Nature Serve*), Kevin Skerl, and Chris Davis (*National Park Service*) conducted field work, June 12-18, for the CUVA Vegetation Mapping Project. The group tied together aerial imagery collected by *UMESC* staff with ground vegetation classified to the National Vegetation Classification Standard 2.0 (NVCS 2) to produce a complete NVCS 2 - compatible map of CUVA.

Sleeping Bear Dunes National Lakeshore (SLBE)

- Kevin Hop (*UMESC*) conducted the close-out meeting for the National Park Service (NPS) SLBE vegetation mapping project, June 29-30 at the SLBE Headquarters in Empire, MI. The SLBE vegetation mapping project supports the NPS Vegetation Inventory Program. Hop gave several presentations on the vegetation mapping project and presented the detailed vegetation map layer, accuracy assessment results, project report, and associated products (*e.g., aerial photography, vegetation classification materials*) created for the SLBE by *UMESC*. Attendees included representatives from the NPS and NatureServe. The primary objective of the NPS Vegetation Inventory Program is to produce data sets of vegetation occurring within national park units. This information fills and complements a wide variety of resource assessment, national park management, and conservation needs.

Other

Outreach

- Forty, fourth through fifth grade, students attended the eleventh annual [Environmental Explorers](#) day camp in La Crosse, WI, June 21-22. The campers, under the guidance of scientists from the USGS Upper Midwest Environmental Sciences Center and Wisconsin Department of Natural Resources, learned about animals, habitats, and ecological relationships of the Upper Mississippi River, during a two-day camp cosponsored by USGS and the University of Wisconsin-La Crosse. The campers learned to band songbirds, radio track animals, navigate with maps and GPS, and collect samples of water, aquatic plants, amphibians, fish, and insects.

Acronyms

CUVA – Cuyahoga Valley National Park
 EAC – Endocrine-Active Contaminants
 EPA – U.S. Environmental Protection Agency
 FWS – U.S. Fish and Wildlife Service

GLFC – Great Lakes Fishery Commission
GLRI – Great Lakes Restoration Initiative
LTRMP – Long Term Resource Monitoring Program
NCLI – National Conservation Leadership Institute
NPS – National Park Service
NVCS – National Vegetation Classification Standard
PMI-FAs – Polymethylene-Interrupted Fatty Acids
SLBE – Sleeping Bear Dunes National lakeshore
TFM – 3-trifluoromethyl-4-nitrophenol (*a lampricide*)
UMESC – Upper Midwest Environmental Sciences Center
USGS – U.S. Geological Survey
WICCI – Wisconsin Initiative on Climate Change Impacts