

# Upper Midwest Environmental Sciences Center November 2010 Activity Report

## Aquaculture Chemicals & Drugs

### Meetings

- Mark Gaikowski, Theresa Schreier, and Jon Amberg (*UMESC*) attended the [SETAC North America 31st Annual Meeting](#) in Portland, OR, November 10. Gaikowski (*UMESC*) and Eric Silberhorn (*FDA, Center for Veterinary Medicine*) co-chaired the veterinary drug session, "Risk Assessment of Veterinary Pharmaceuticals in the Environment." During this session Gaikowski presented, "Developing environmental exposure estimates of oral or waterborne aquaculture veterinary pharmaceuticals." Schreier also presented the posters, "Risk Assessment of Veterinary Pharmaceuticals in the Environment," and "Development of a Test System to Continuously and Chronically Expose Newly Transformed Mussels to Waterborne Chemicals."

## Geospatial Science & Mapping

### Flood Inundation Mapping

- John (JC) Nelson (*UMESC*) attended the USGS Flood Inundation Mapping Initiative Meeting at the KY WSC, December 8-9. *UMESC* has a long history of flood work on the Mississippi River and hopes to bring that knowledge and data to the rest of the group.

### LiDAR Data

- Jenny Hanson and Bekki Rohweder (*UMESC*) completed the initial processing of Light Detection and Ranging (LiDAR) data into digital elevation models, contours, and hillshades, for Pools 2, 3, 4, 5, 5a, 6, and 7 of the Upper Mississippi River System (*UMRS, St. Paul, MN to La Crosse, WI*) and the lower St. Croix River. This initial processing is the first of three phases that will allow the LiDAR and bathymetry (*depth*) data sets to be combined into one seamless layer for the entire *UMRS*. These data sets are served on *UMESC*'s website as part of the Long Term Resource Monitoring Program (LTRMP) ([http://www.umesc.usgs.gov/data\\_library/gis\\_data/lidar.html](http://www.umesc.usgs.gov/data_library/gis_data/lidar.html)).
- John (JC) Nelson and Larry Robinson (*UMESC*) were chosen to participate in the National Enhanced Elevation Assessment survey. The survey is the first-ever national assessment of requirements, costs and benefits for enhanced elevation data by participating in an important on-line questionnaire to document nationwide business use requirements, costs and benefits of Enhanced National Elevation Data. Enhanced elevation data refers to precise three-dimensional measurements of the terrain, built-up features, vegetation structure, submerged near-shore topography, and other landscape attributes as primarily measured by LiDAR technology. Larry and JC will use their experiences with LiDAR collected for the Upper Mississippi River System to aide them in answering the survey's questions. The National Enhanced Elevation Assessment is a partnership between the USGS and member agencies of the National Digital Elevation Program (NDEP).

### Midwest Mining Initiative

- John (JC) Nelson (*UMESC*) attended the Midwest Area Mining Initiative Workshop in Reston, VA, November 16-18. *UMESC* and the KY WSC are cooperating on the development of a web based Decision Support System (DSS) tool.

### National Park Mapping

- Kevin Hop (*UMESC*) presented, "National Park Service Vegetation Inventory and Mapping Lessons Learned," at the American Society of Photogrammetry and Remote Sensing conference, [Geospatial Data and Geovisualization: Environment, Security, and Society](#), November 15-19, Orlando, FL. Hop's presentation focused on the pros and cons of the digital

three-dimensional mapping procedures used for mapping the Buffalo National River, during the special session, "National Park Service Vegetation Inventory and Mapping Lessons Learned."

### **Sedimentation**

- John (JC) Nelson (*UMESC*) is working with John Hoopes (*Civil and Environmental Engineering Department, University of Wisconsin*) to collect GIS data for Swift Creek and Blough Slough in Mississippi River Navigation Pool 8, for a sedimentation project the University of Wisconsin is proposing to the City of La Crosse, WI.

### **Waterfowl Counts**

- Larry Robinson (*UMESC*) and Brian Lubinski (*FWS*) collected the second of three sets of high-resolution digital aerial photography for a waterfowl habitat study looking at vegetation composition of high-use waterfowl feeding areas in Mississippi River navigation Pools 5 through 8 (*Alma to Genoa, WI*).

## **Great Lakes Restoration Initiative (GLRI)**

### **Project 80: Birds as Indicators of Contaminant Exposure in the Great Lakes**

- Christine Custer (*UMESC*) briefed John Tubbs (*DOI, Deputy Assistant Secretary for Water and Science*) on GLRI Project 80 during Tubbs visit to the Midwest Area Office, Ann Arbor, MI, November 9. Project 80 is providing valuable data of immediate use to DOI agencies, the Environmental Protection Agency (EPA), and state regulatory agencies.
- Thomas Custer and Christine Custer (*UMESC*) presented a poster on GLRI Project 80 at the [18th National Nonpoint Source Monitoring Workshop](#) in Milwaukee, WI, November 16–18. The theme for this year's workshop was; Monitoring and Evaluation Workshop for GLRI: Watersheds Best Management Practices, Planning, Implementation, and Documenting Results. A number of the new and emerging contaminants (*e.g., polybrominated flame retardants, PCDEs*) are classified as nonpoint source contaminants and are increasing in environmental samples. Relatively little is known about exposure and effects of this class of chemicals.
- Thomas Custer and Christine Custer (*UMESC*) traveled to and evaluated Manistique, MI and Menominee, WI as potential sites to be added to GLRI Project #80. Bird boxes were set up on the Manistique River in areas of interest to the EPA. Sites include land owned by the City of Manistique and the Manistique Paper Corporation.

### **Project 73: Avian Botulism in Distressed Great Lakes Environments**

- Steve Houdek, Kevin Kenow (*UMESC*), and John Bidwell (*FWS*) conducted aerial waterbird surveys of selected areas of Lake Michigan, November 8-11. The work is part of an effort to document the distribution and abundance of migrating waterbirds, associated with the GLRI Project 73.
- Kevin Kenow (*UMESC*) gave the presentation, "Research in Support of Common Loon Conservation" at the Coulee Region Audubon Society meeting, November 17. Common loon populations in the Great Lakes region appear to be generally stable over the past decade. Yet, concerns about the effects of habitat alteration, contaminants, disease, and potential impact of climate change on common loon populations have recently surfaced. For example, a substantial number of loons have succumbed to recent outbreaks of Type E botulism in the Great Lakes, and many questions have surfaced concerning potential impacts of the Gulf Oil Spill on loons that traditionally winter in the Gulf of Mexico. The presentation covered life history, status of common loons in the Great Lakes region, and current research efforts that are underway to provide information to support the development and implementation of regional common loon conservation strategies.

## **Invasive Species**

### **Meetings**

- Scientists from USGS's Upper Midwest Environmental Sciences Center gave the following presentations at the [2010 Minnesota-Wisconsin Invasive Species Conference](#) in St. Paul, MN, November 8-10.
  - "Development of Methods to Orally Deliver Biocides to Control or Limit Invasive Aquatic Animals," by Terrence Hubert and Mark Gaikowski.
  - "Preliminary Characterization of Digestive Enzymes in Native Mussels and Zebra Mussels: A Step Toward Developing a Species-Specific Control for Aquatic Invasive Species," by Blake Sauey, Scott Cooper, Sandra Grunwald (*University of Wisconsin-La Crosse*), Jon Amberg, Teresa Newton, and Mark Gaikowski (*UMESC*).
  - "Efforts to Develop Potential Selective Agents for the Control of Common Carp (*Cyprinus carpio*) through Large-Scale Synthesis of GD-174 and Analog Design," by Jon Scherr, Rhianna Nichols, Tammy Clark (*Viterbo University*), Terrance Hubert, and Mark Gaikowski (*UMESC*).

## Large Rivers

### Meetings

- Ken Lubinski (*UMESC*) gave two invited presentations at the INDO-US workshop, "A Joint Conference on: Sedimentation, Erosion, Flooding, and Ecological Health of Rivers," Kolkata, India, Nov. 1-3. The presentation, "The Concept of River Ecosystem Health and its Relationship to Management," discussed a process for defining river ecosystem health. The second presentation described river science within the USGS and at the Upper Midwest Environmental Sciences Center. The workshop was held at the Indian Statistical Institute, sponsored by the Indo-US Science and Technology Forum.
- Tom Worthington (*Deputy Chief for Refuges FWS Region 3*) and a delegation of 10 visiting Chinese scientists visited *UMESC* on November 7 to learn about the Center and its research programs. Jack Waide, Brian Ickes, and Barry Johnson gave overview presentations on *UMESC*'s research mission and research portfolio, and the Long Term Resource Monitoring Program for the UMRS.

### Other

- Mike Jawson, Brian Ickes and Yao Yin (*UMESC*) attended the 5-Year Celebration of The Nature Conservancy's (TNC) Great Rivers Partnership, Peoria, IL, November 10. The Great Rivers Partnership involves cooperation among TNC, USGS, U.S. Army Corps of Engineers, and various foundations, organizations, and private businesses, to apply science to understanding and managing the world's large rivers. Over the last few years *UMESC* has participated in exchanges of scientists between the U.S. and China to develop monitoring designs and protocols for the Yangtze River, based on those used by the LTRMP on the UMRS. Comparable data will lead to joint data analyses and better understanding of issues and management options between river systems.

## Mississippi River

### Meetings

- William Richardson (*UMESC*) was invited to give the platform presentation, "[Differences in nitrogen cycling characteristics in a natural and reclaimed wetland: Implications for nitrogen load mitigation](#)," at the [International Annual Meeting of the American Society of Agronomy \(ASA\), Crop Science Society of America \(CSSA\), and the Soil Science Society of America \(SSSA\)](#) in Long Beach California, October 31-November 3. Richardson's presentation was given during the symposium, "Soils of reclaimed landscapes: recycling, renewing, and reusing depleted environments."
- Mike Jawson and Barry Johnson (*UMESC*) attended the [quarterly meetings](#) of the Upper Mississippi River Basin Association (UMRBA), Navigation Environmental Coordination

Committee (NECC) and Environmental Management Program Coordinating Committee (EMP-CC) in Rock Island, IL, November 16-18.

- Ken Lubinski (*UMESC*) was invited to discuss project monitoring options at a Mississippi River Basin Healthy Watershed Initiative meeting for local partners involved with the Root River and Upper Cedar River Cooperative Conservation Partnership Initiative (CCPI) and Wetland Reserve Enhancement Program (WREP), November 18, by TNC, Trout Unlimited, and the Minnesota Soil and Water Conservation District Employees Association. The meeting provided an opportunity to consider opportunities to coordinate monitoring across two major programs, the Mississippi River Basin Initiative (MRBI) and the National Fish Habitat Action Plan.
- Kevin Kenow, Pete Boma, and Steve Houdek (*UMESC*) met with Jim Nissen and Jessica Larson (*FWS*) to discuss observation work that was completed to document boating compliance with the Lake Onalaska Voluntary Waterfowl Avoidance Area program, November 22.
- Kevin Kenow (*UMESC*) met with FWS and Upper Mississippi River National Wildlife Refuge staff to review and discuss a recent hydrogeomorphic evaluation of the Refuge's Root River Tract, November 23. The evaluation is being used to guide future wetland management options of recently acquired land.

## Native Mussels

### Meetings

- Teresa Newton (*UMESC*) was invited to give the presentation, "Response of Native Mussels to Water Level Manipulation in the Upper Mississippi River," at the Upper Mississippi River's Water Level Management Task Force meeting, Winona, MN, November 9. Resource managers are lowering water levels in select reaches of the Upper Mississippi River to enhance production of emergent plants to benefit fish and wildlife. However, there are concerns about the possible adverse effects of a draw down on native mussel populations. This study is evaluating the fraction of mussels able to move into deeper water and avoid some of the potential short-term effects of a draw down.

### Publications

- Steve Zigler and Teresa Newton (*UMESC*) co-authored a paper on the mechanisms that affect dispersal and subsequent settlement of juvenile mussels in large rivers. A three-dimensional hydrodynamic model with particle tracking was used to describe the physics of the juvenile dispersal process, and shows the potential to locate areas where juveniles are likely to settle given a population size and distribution of host fish species for conservation purposes. Models showed greater than 50% of juvenile mussels settled on the river bottom within 500m of their point of release from the fish host, regardless of the vertical location of the fish in the water column. Dispersal distances were most variable in environments with higher velocity and high gradients in velocity, such as along channel margins, near the channel bed, or where effects of river bed morphology caused large changes in hydraulics. Juvenile dispersal distance is likely to be more variable for mussel species whose hosts inhabit areas with steeper velocity gradients (*e.g. channel margins*) than a host that generally inhabits low-flow environments (*e.g. impounded areas*).
  - J. A. Daraio, L. J. Weber, S. J. Zigler, T. J. Newton and J. M. Nestler. 2010. [Simulated Effects of Host Fish Distribution on Juvenile Unionid Mussel Dispersal on a Large River](#). River Research Applications: DOI: 10.1002/rra.1469.

## Wildlife Ecology

### Meetings

- Wayne Thogmartin (*UMESC*) presented, "Modeling and Mapping Mammalian Nest Predator Abundance in the Prairie Pothole Region," to the University of Wisconsin's Department of

Forest and Wildlife Ecology, November 17, Madison, WI. While in Madison Thogmartin also attended a doctoral committee meeting for Chris Hamilton. Hamilton is embarking upon a collaborative study examining the connectivity of reserve lands in the upper Midwestern US in the face of changing climate, land use, and human population distribution. Funds for this research were provided, in part, by the Science Support Program.

## Other

### Meetings

- Jack Waide (*UMESC*) hosted a visit from Rich Leopold (*Assistant Regional Director for Science FWS Region 3*), November 30. Leopold visited *UMESC* to gain awareness of the Center's science programs and capabilities.

### Acronyms

ASA – American Society of Agronomy  
CCPI – Cooperative Conservation Partnership Initiative  
CSSA – Crop Science Society of America  
DOI – Department of the Interior  
DSS – Decision Support System  
EMP-CC – Environmental Management Program Coordination Committee  
FDA – U.S. Food and Drug Administration  
FWS – U.S. Fish and Wildlife Service  
GIS – Geographic Information System  
GLRI – Great Lakes Inventory  
LiDAR – Light Detection and Ranging  
LTRMP – Long Term Resource Monitoring Program  
MRBI – Mississippi River Basin Initiative  
NDEP – National Digital Elevation Program  
NECC – Navigation and Environmental Coordination Committee  
SETAC – Society of Environmental Toxicology and Chemistry  
SSSA – Soil Science Society of America  
TNC – The Nature Conservancy  
UMESC – Upper Midwest Environmental Sciences Center  
UMRBA – Upper Mississippi River Basin Association  
UMRS – Upper Mississippi River System  
USGS – U.S. Geological Survey  
WREP – Wetland Reserve Enhancement Program