Upper Midwest Environmental Sciences Center
May 2011 Activity Report

Amphibian Research and Monitoring Initiative (ARMI)

- Walt Sadinski and Mark Roth (*UMESC*) shared ARMI program survey data on the distribution of the northern cricket frog (*Acris crepitans*) in the Winona, MN area since 2004, with the Minnesota Department of Natural Resources (DNR). The city of Winona is planning an airport expansion and one of two known extant populations of the northern cricket frog in Minnesota occupy wetlands adjacent to the airport, including lands managed by the U.S. Fish and Wildlife Service (FWS). The northern cricket frog was listed as endangered in 1996 under the Minnesota Endangered Species Statute, so the Minnesota DNR is assessing any potential impacts that may occur resulting from an airport expansion.

Aquatic Invasive Species – Sea Lamprey

Experimental Use Permits

- The U.S. Environmental Protection Agency (EPA) approved a new Experimental Use Permit (EUP, #75437-EUP-4) to field test the effectiveness of the male sea lamprey mating pheromone (3-ketopetromyzonol-24-sulfate) as an attractant May 9. Scientists at UMESC prepared the EUP application to support a collaborative project between the GLFC, Michigan State University, and Seton Hall University. If effective, the mating pheromone product will result in the development of a "sea lamprey bait," that could be used to lure lamprey into unmanned traps. Current test formulations of the pheromone require the use of metered pumps to deliver the pheromone, a method which requires continuous supervision by trained personnel.

Aquatic Invasive Species – Zebra Mussel

Biocide Project

- UMESC scientists, the New York State Museum Field Research Laboratory, and Fish and Wildlife Service's Genoa National Fish Hatchery initiated the first phase of a 3-year study to evaluate the non-target animal effects of a candidate zebra mussel (*Dreissena polymorpha*) biocide, a toxin produced by the bacterium *Pseudomonas fluorescens* (Pf-CL145A). The study will include both laboratory evaluations of the effects of Pf-CL145A to three different life stages of seven unionid mussel species and 10 fish species endemic to the Great Lakes and Mississippi River watersheds, and field trials to determine the efficacy of treatments to reduce zebra mussel colonization on native mussel culture cages. The project was funded through a competitive grant awarded by the EPA through the Great Lakes Restoration Initiative (GLRI). For more information contact Jim Luoma (jluoma@usgs.gov).

Climate Change

Native Mussels

- Teresa Newton *(UMESC),* Alissa Ganser, and Patty Ries *(Univ. of Wisconsin-La Crosse)* initiated two studies to look at the effects of climate change on native freshwater mussels. In their first study they are exposing two species of juvenile mussels to one of four temperatures and measuring oxygen consumption, heart rate, and growth rate as test endpoints in during a 28-day testing period. In the second study, gravid female pocketbook mussels *(Lampsilis cardium)* are exposed to one of four temperatures and measurements are collected on a suite of reproductive endpoints *(release of gametes, parturition of larvae, mantle lure display behavior)* during a 4-day testing period to estimate the temperature at which reproductive traits are altered. These data will be input into down-scaled watershed and in-stream regional models so that federal and state resource managers can forecast species responses to climate change over the next 30-50 years.

Wisconsin

- Barry Johnson (*UMESC*) participated in a meeting of the Science Panel for the Wisconsin Initiative on Climate Change Impacts (WICCI), May 2 in Madison, WI. This meeting focused on the next phase of climate change work by the WICCI, including: extending downscaled climate models to the Great Lakes and Upper Mississippi River watersheds, integrating climate effects and adaptation strategies for both ecological and social outcomes, and communicating adaptation strategies discussed in the recent report, "Wisconsin's Changing Climate: Impacts and Adaptation," (http://www.wicci.wisc.edu/publications.php).

Endangered Species

Indiana Bats / White-nose Syndrome

- Wayne Thogmartin and Patrick McKann (*UMESC*) presented results of research describing the spread and impact of the fungal disease White-nose Syndrome on endangered Indiana bats at the annual White-nose Syndrome Symposium, Little Rock, AR, May 17-19. Results suggest the near-term risk of infection is high (>40%) for more than 1/3 of all Indiana bats and that within 2 decades more than 90% of wintering populations are expected to be afflicted with this disease. This raises the background risk of quasi-extinction from ~5% to >55% within the century.

Great Lakes Restoration Initiative (GLRI)

Project #80, Birds as Indicators of Contaminant Exposure

- Tom Custer and Chris Custer (*UMESC*) met with Joel Mazur *(Brownfield Redevelopment Officer, City of Toledo),* and obtained permission to install bird boxes on the Maumee River just east of downtown Toledo, OH, as part of GLRI Project #80. The Maumee River is a Great Lakes Area of Concern. Tree swallow egg collections are underway at many of the 32 Great Lakes study sites in Lakes Superior, Huron, Michigan, Erie, and Ontario. Samples were collected for the first time at our eastern most sites near Cape Vincent, NY, on the Saint Lawrence River and near Chaumont, NY, on the Chaumont River.

Project #73, Avian Botulism in Distressed Great Lakes Environments

- Kevin Kenow (*UMESC*) initiated field work to monitor the return of breeding common loons that were marked with geolocator tags last summer. Geolocator tags were attached to 79 adult loons breeding in Wisconsin and Minnesota. These devices were programmed to record a daily location estimate, temperature, and pressure data to provide information on foraging depths. The marking of common loons last summer was part of an effort to study the migratory movements and foraging patterns while migrating through the Great Lakes in association with a USGS study on avian botulism. The marked loons will be targeted for recapture this spring and summer so that data stored on the geolocator tags can be retrieved.

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

- Jon Vallazza, Jason Veldboom and Ben Uphoff (*UMESC*) sampled the Manitowoc River, WI, as part of an intensive effort to characterize and understand the ecology and dynamics of Great Lakes rivermouth ecosystems, May 23-28. The Manitowoc , Ford, and Pere Marquette Rivers are being intensively sampled *(a)* in areas with no detectable interaction with the Great Lakes, *(b)* in the rivermouths where a mix of river and lake water occurs, and *(c)* within and outside of the river plume in Lake Michigan. The biological materials being collected include food sources *(algae and fine particles in transport, attached algae, decaying organic matter),* primary consumers of organic matter *(filter-feeding and algal-grazing insects, molluscs, and microcrustaceans),* and secondary consumers *(young fish).* This material will be analyzed for

stable isotopes of carbon and nitrogen and fatty acids to determine food sources, food chain length, and organism health. 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. The sampling of these sites is being performed in collaboration with scientists from the Great Lakes Science Center, who will focus on analyzing water mixing of Lake and river water in and outside the rivermouths.

Geospatial Science & Technology

Presentations

- Jennifer Dieck, Larry Robinson, Janis Ruhser, Jenny Hanson, Erin Hoy, and Andrew Strassman (*UMESC*) attended the American Society of Photogrammetry and Remote Sensing (ASPRS) conference in Milwaukee, WI, May 2-5. Jennifer Dieck and Cynthia Berlin *(University of Wisconsin-La Crosse)* gave the presentation, "An assessment of LiDAR data for enhancing automated land cover classifications using aerial photographs for Pool 5 of the Upper Mississippi River." The mission of the ASPRS is to advance knowledge and improve understanding of mapping sciences and to promote the responsible applications of photogrammetry, remote sensing, geographic information systems (GIS), and supporting technologies.

- John (JC) Nelson (*UMESC*) presented the poster, "LiDAR and Bathymetric Data Integration for the Upper Mississippi River System," at the USGS GIS Workshop and National Map Workshop in Denver, CO, May 10-13. The goals of the workshop and conference were to serve and enhance communications among the communities of users of The National Map, Federal GIS specialists and scientists, and data providers. Topics included existing applications and visions for future scientific and modeling applications using The National Map, opportunities for partnerships, and advances in geospatial technologies. The event focused on user and partner interactions using various formats: interactive panels, lightening sessions, poster presentations, workshops, oral presentations, and demonstrations. The workshop was designed to provide a relaxed, collaborative, and informative venue to explore the direction of The National Map, mapping trends, and GIS applications.

Cooperative Projects

- John (JC) Nelson (*UMESC*) has been working with the State of Illinois to process remote sensing data that will aid the state's emergency management agency in assessing the current flooding situation.

- Jennifer Dieck, Tim Fox, Jason Rohweder, Nate DeJager, and John (JC) Nelson (*UMESC*) met with Kelly Srigley Werner and Dan Crigler *(Missouri Private Lands Office, FWS)* to discuss potential collaboration on work in the Missouri Confluence, May 17. Discussions included vegetation analysis, modeling of habitats based on high priority bird species, using LiDAR to help make better decisions in designing wetland restoration of private lands, and the possibility of using the U.S. Fish and Wildlife Service's potential upland duck breeding habitat maps (i.e., Thunderstorm Maps).

Mississippi River

Inter-agency Cooperative Projects

- Mike Jawson and Barry Johnson (*UMESC*) participated in the quarterly meetings of the Upper Mississippi River Basin Association (UMRBA), May 17-19, Rock Island, IL. The UMRBA is a regional interstate organization formed by the Governors of Illinois, Iowa, Minnesota, Missouri, and Wisconsin to coordinate the states' river-related programs and policies and work with federal agencies that have river responsibilities. Jawson and Johnson participated in the

UMRBA committee meeting, the Navigation Environmental Coordination Committee (NECC), and the Environmental Management Program Coordinating Committee (EMP-CC).

National Park Mapping

Appalachian National Scenic Trail (APPA)

- Andrew Strassman, Kevin Hop, and Jennifer Dieck (*UMESC*) met with Karl Brown, Tammy Cook, and Chris Lea (NPS) on May 19 to determine how the APPA Vegetation Mapping Project should handle existing Vegetation Inventory Project (VIP) maps where they overlap. Topics included edge match, classification schemes, and mapping extent.

International Partnerships

Yangtze River, China

- Brian Ickes (*UMESC*) traveled to China, May 16-28, to assist with the implementation of fish sampling and radio tracking that will allow for comparisons between the Yangtze and Mississippi Rivers. Ickes coordinates fishery projects for the Upper Mississippi River's Long Term Resource Monitoring Program, a cooperative research and monitoring program between the U.S. Army Corps of Engineers, USGS, and the states of Illinois, Iowa, Minnesota, Missouri, and Wisconsin. This trip is sponsored and funded by The Nature Conservancy's Great Rivers Partnership (GRP) which is leading the initiative that includes these cross-basin river science exchanges. UMESC has a contractual agreement with the GRP for Ickes service as a GRP Yangtze Fellow.

Acronyms

APPA – Appalachian National Scenic Trail
ARMI – Amphibian Research and Monitoring Initiative
ASPRS – American Society of Photogrammetry and Remote Sensing
CUVA – Cuyahoga Valley National Park
DOI – Department of the Interior
DNR – Department of Natural Resources
EMP-CC – Environmental Management Program Coordination Committee
EPA – U.S. Environmental Protection Agency
EUP – Experimental Use Permit
FWS – U.S. Fish and Wildlife Service
GIS – Geographic Information Systems
GLFC – Great Lakes Fishery Commission
GLRI – Great Lakes Restoration Initiative
GRP – Great River Partnership
IAGLR – International Association for Great Lakes Research
LiDAR – Light Detection And Ranging
MOCC – Motorboat Operator Certification Course
NCLI – National Conservation Leadership Institute
NECC – Navigation Environmental Coordination Committee
Pf-CL145A – A toxin produced by the bacterium *Pseudomonas fluorescens*
UMESC – Upper Midwest Environmental Sciences Center
UMRBA – Upper Mississippi River Basin Association
USGS – U.S. Geological Survey
VIP – Vegetation Inventory Project
WICCI – Wisconsin Initiative on Climate Change Impacts