Emiquon Science 2009: Rebirth of Emiquon

Dickson Mounds Museum March 12, 2009

8:30-9:00 **Registration and Coffee** - Dickson Mounds Museum Lobby, 1st floor

Morning Oral Session - Dickson Mounds Museum Auditorium

9:00 **Welcome:** Mike Wiant, Director of Dickson Mounds Museum
Mike Lemke, Director of the Emiquon Field Station

9:15-10:30 **The Nature Conservancy: Emiquon Preserve Information Session and Updates**

9:15 ***Emiquon Overview***
Doug Blodgett

9:30 ***Emiquon 2009 Plan of Work***
Tharran Hobson

9:45 ***Emiquon Researcher and Visitor Use***
Jason Beverlin

10:00 ***Emiquon Key Ecological Attributes***
Jim Herkert

10:15 ***Using Emiquon to Advance Integrated River Management***
Michael Reuter

10:30 - 10:45 **Break** - 1st floor cafe area

10:45-12:30 p.m. **The ReBirth of Emiquon** - Dickson Mounds Museum Auditorium

10:45 ***Saving a Species, One River at a Time: The Return of Boltonia decurrens to Emiquon***
Mettler-Cherry, P. and M. Smith

11:05 ***Wetland and Waterbird Monitoring at Emiquon Preserve During 2008***
Smith, R., J. Stafford, A. Yetter, C. Hine and M. Horath

11:25 ***The Nature Conservancy's Emiquon Preserve: Fish and Aquatic Vegetation Monitoring 2007-2008.***
Michaels, N. N., G. G. Sass, T. R. Cook, T. M. O'Hara, K. S. Irons, and M. A. McClelland

11:45 ***Water Quality and Aquatic Invertebrates as Related to Key Ecological Attributes at Emiquon***
A. M. Lemke, S. McClure, and M. J. Lemke

12:05 ***New Perspectives on 15,000 years of Change at Emiquon***
McClure, S. E. Hajic and A. Harn.

12:30 - 1:00 p.m. **Lunch** - Dickson Mounds Museum Activities Room

Afternoon Poster and Networking Session - Dickson Mounds Museum Activity Room
1:00 - 2:30 p.m.

Emiquon and the Web: Encouraging Support for Sustainability
Burton, M., M. Kok, M. Cheney, and K. W. Miller

Greenhouse Gases and Floodplain Wetlands
Chen, H., S. Popovich, and K. Ghotra

The 2008 Dickson Mounds Museum Michigan State University Excavations at Morton Village
Connor, M.

Three-Year Study of Bacterial Diversity and Water Quality Indicators in Lakes of the Illinois River Floodplain System
Dungey, K., M. J. Lemke, D. Kellerhals, A. Waters, and K. Bartosiak

The Microbial Ecology of Thompson Lake
Lemke, M. J., M. Randle, F. Velho, A. Kent, K. Dungey, D. Kellerhals, and M. Usherwood.

Citizen Science at Emiquon: Restoring Eastern Bluebirds to the Wetland
McGrew, C.

Investigating Nitrogen Cycling During Early Floodplain Development from a Microbial Community Perspective
Peralta, A. L., J. W. Matthews, A. D. Kent

Science and Education at the Emiquon Field Station.
Purnell, M, Lemke, M. J., K. M. Miller, M. Cheney, J. Bonacum, H. Chen, K. Dungey, M. Kok, M. Burton

Seed Limitation: Does a Second Seed Sowing Enhance Succession and Invasion Resistance in Prairie Restorations?
Ramey, J. and A. McEuen

Developing a Multimetric Habitat Index for Wadeable Streams in Illinois
Sass, L., A. Holtrop, L. Hinz, and J. Epifanio

Ten Years of Vegetation Change at Spunky Bottoms
Sluis, W.

Floodplain Restoration at Upper Ouachita National Wildlife Refuge, LA
Weber, D., S. Haase, and R. Ulmer

2:30 **Keynote Address** - Dickson Mounds Museum Auditorium

Restoring the Mississippi River Basin: Wetlands, rivers, floodplains, and delta

Bill Mitsch, The Ohio State University

Distinguished Professor of Environment and Natural Resources
Director, Wilma H. Schiermeier Olentangy River Wetland Research Park

The 20,000 km^2 hypoxia in the Gulf of Mexico has served to focus attention on the fact that the Mississippi-Ohio-Missouri (MOM) Basin is saturated with nutrients, mainly from agricultural activity, and that there is need for ecological solutions in addition to agronomic ones. Hurricane Katrina in 2005 focused attention on the fact that coastal Louisiana has been losing wetlands for decades and with that loss, the protection that is afforded by those wetlands. A new ecologically engineered river landscape is needed in the Delta, the Midwest and the entire MOM basin to counteract these problems but also address local water pollution and flood problems. Research at the Olentangy River Wetland Research Park and elsewhere are discussed as places where these problems are being addressed and estimates are being made of the scale of the solution.

Currently at The Ohio State University, Dr. Mitsch has been awarded numerous prestigious prizes including the 2007 Lifetime Achievement Award from the Society of Wetland Scientists, the 2005 Theodore M. Sperry Award from the Society for Ecological Restoration International, and the 2004 Stockholm Water Prize.

3:30-5:00 p.m. **Tour of the Emiquon Preserve and UIS Field Station**
Meet at front doors of Dickson Mounds Museum

After Meeting Refreshments
Dickson Mounds Museum Cafeteria (main floor)

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Emiquon Science 2009 is our second meeting focused on the restoration activities at The Nature Conservancy's Emiquon Preserve. This event is co-sponsored by The Nature Conservancy, Dickson Mounds Museum, and the Emiquon Field Station. It is our intention to make this meeting an annual event. Your comments about the organization and content for next year's meeting are appreciated and may be directed to Mike Lemke, Director of the Emiquon Field Station (lemke.michael@uis.edu).

Our special thanks to:

All the staff at Dickson Mounds Museum, especially Kim Dunnigan and Kelvin Sampson for facility support

The staff of The Nature Conservancy

Emiquon Field Station Advisory Board

UIS Friends of Emiquon Sponsorship

Abstracts *(alphabetical by first author)*

Emiquon and the web: encouraging support for sustainability
Burton, Mary, Marilyn Kok, Michael Cheney, and Keith W. Miller
Emiquon Field Station, Lewistown, IL

The Web can be effective tool both for raising awareness, fund raising, and the dissemination of scientific data. All three of these goals are important at Emiquon. The Emiquon Field Station is establishing a Web presence to make progress in these areas.

Greenhouse gases and floodplain wetlands
Chen, Hua, Sarah Popovich, and Kamalprit Ghotra
Biology Department, University of Illinois at Springfield

Carbon dioxide (CO2) and methane (CH4) are the two major greenhouse gases in the atmosphere that contribute to the ongoing global warming. The loss of wetlands for croplands results in a release of about 10 Mg C ha-1 from soil organic matter into atmosphere. One way to mitigate the rising CO2 concentration in the atmosphere is to increase carbon (C) sequestration in lands by wetland restoration from croplands because wetlands can sequestrate over twice as much soil organic C as no-till croplands. However, wetlands also have been well recognized as a net contribution of atmospheric methane. The overall goal of this study is to quantify how C stocks (e.g., soil organic C and plant C) and flux (e.g., CH4) change in two restored wetlands with varying restored ages. The wetland restoration of Emiquon and Spunky Bottoms site was launched in 2007 and 1997, respectively. In the summer of 2007, we preliminarily collected soil samples from both restored wetland sites and one corn field. The total soil organic C stocks in these two restored wetlands were estimated. In this poster, we will present the preliminary carbon stock data. Then, we will propose a more detail sampling plan to measure C stocks in soils and plants at these two restored wetland sites. Moreover, we will use static chamber and gas chromatography techniques to quantify CH4 emission in these two restored wetlands and explore factors controlling CH4 emission. Finally, we will evaluate the impacts of wetland restoration from croplands on carbon sequestration.

The 2008 Dickson Mounds Museum Michigan State University excavations at Morton Village
Connor, Michael.
Dickson Mounds Museum

From A.D. 1050 to about 1400, prehistoric Native Americans living in the Central Illinois River Valley were part of the Mississippian tradition, with cultural ties to the major Mississippian center at the Cahokia site near St. Louis. However, sometime in the late 1200s a group of people representing another cultural tradition, called Oneota, migrated into the region near Dickson Mounds. The Oneota tradition is primarily found in northern Illinois, Wisconsin, Iowa, and Minnesota. In 2008, Michigan State University and Dickson Mounds Museum began excavations at an early Oneota site at the northern end of the Emiquon Preserve in the hopes of learning more about this migration and about interactions between Mississippian and Oneota groups, which may have included both conflict and cooperation. The poster shows examples of houses and pits excavated at the site and artifacts recovered in the first season of this multiyear project.

Three-year study of bacterial diversity and water quality indicators in lakes of the Illinois River floodplain system
Dungey, Kennan,*, M. J. Lemke**, D. Kellerhals**, A. Waters**, and K. Bartosiak*
*Chemistry Department, University of Illinois at Springfield
**Biology Department, University of Illinois at Springfield

The Illinois River floodplain system encompasses many biologically and chemically distinct habitats. The objective of this study was to identify differences in lake water quality and bacterial diversity within the system. Three lakes seasonally connected to the Illinois River were compared with three unconnected lakes. Water samples were collected in the summers of 2006-08, along with numerous field and analytical chemical and physical measurements. The samples were filtered through two filters of different pore sizes to capture particle-associated (> 3.0 µm) and free-living bacteria (3.0-0.2 µm) followed by DNA extraction. Bacterial diversity

measured by denaturing gradient gel electrophoresis (DGGE). Changes in drought and flood caused dramatic changes in the physico-chemical environments for all of the lakes. Multivariate analysis of the bacterial community composition revealed that the lakes clustered by year. Within each year, canonical discriminate analysis of variables revealed the unconnected lakes grouped more closely and were different from the connected lakes, which were different from the Illinois River. DGGE results showed more diversity and a different array of operational taxonomic units (OTUs) in free-living bacterial communities than particulate throughout the study period. These results suggest that the flooding and/or runoff-induced variation in water nutrient levels affects bacterial community composition more strongly for the free-living communities than for the particle-associated communities.

Water quality and aquatic invertebrates as related to Key Ecological Attributes at Emiquon

Lemke, Maria, Sally McClure, and Michael Lemke**
*The Nature Conservancy
**University of Illinois at Springfield

During pre-restoration planning for the Emiquon Preserve, The Nature Conservancy and its partners identified Key Ecological Attributes (KEAs) that specify what elements are important to manage and monitor for selected conservation targets in order to assess conservation progress of those targets. Specified indicators are measured as part of this assessment process that monitor changes in the status of KEAs. Thus, KEAs and associated indicators provide the framework for evaluating progress of the ecological restoration at Emiquon. Water quality and aquatic invertebrates have been identified as important indicators for measuring habitat quality and food base for fish and waterfowl targets. Dissolved oxygen and water depth are indicators used to determine fish habitat conditions during spawning and winter seasons. Availability of benthic invertebrates for waterfowl and small zooplankton for fish young-of-year are also important indicators to measure in order to monitor restoration success. In 2008, we obtained water quality data using real-time and handheld data loggers, and from biweekly water samples that were analyzed for chlorophyll a and total suspended sediments. Zooplankton samples were collected weekly during the fish spawning season and at 3-4 week intervals during the rest of the year. Benthic micro- and macroinvertebrates were collected every 3-4 weeks throughout the year. Our presentation will provide an update of several of these water quality measuremes and availability of the invertebrate food base as related to Emiquon KEAs during 2008.

The microbial ecology of Thompson Lake

Lemke, Mike J*., M. Randle*, F. Velho^, A. Kent+, K. Dungey*, D. Kellerhals*, and M. Usherwood. *University of Illinois at Springfield, Springfield, IL ^ State University of University of Maringa, Maringa, Parana, Brazil
+University of Illinois at Champaign-Urbana, Urbana, IL

Aquatic microbial communities are unique in that they can simultaneously be affected by their environment while drastically altering the same environment that they live in. In addition, they serve as the initial link between nutrients and the food web. The objective of this study was to relate changing water quality conditions in newly restored Thompson Lake to biotic indicators that change in step with lake conditions; bacteria, protozoa, and zooplankton. Lake water was sampled weekly (March-Nov. 2008) and physical (e.g., light, temperature), chemical (TN, TP, pH) and biotic (listed above) data were collected. Some changes were evident on an ecosystem level. Clear water in spring increased in turbidity at about the same time bottom water decreased in dissolved oxygen (late June) producing the first extensive cynobacterial bloom, presumably due to sediment phosphorus release under reducing conditions (TP data analysis in process); three more blooms were to follow. Of the protist community analyzed to date, ciliates were the most abundant. O. Oligotrichida was the dominant group through mid-September producing July and September blooms; O. Peritrichida were also evident in these peaks. Rotifers, while an order of magnitude lower than ciliates, were highest in April and September; copepods were most abundant in early-mid June. DNA “fingerprinting” of the bacterial community (ARISA method) showed sequential and directional change throughout the sampling period. Parallel work is being completed on Lake Chautauqua as a comparison system. Ongoing data analysis will help relate changes in water quality parameters to the microbial community.

Abstracts *(continued)* -

New perspectives on 15,000 years of change at Emiquon
McClure, Sally*, Edwin Hajic and Alan Harn^.
*The Nature Conservancy
^Dickson Mounds Museum

Recently completed investigations provide new insights into Emiquon's complex geomorphology and paleo climates and their inter-relationships to some 600 generations of humans who used this land. In 2003, Dickson Mounds Museum and The Nature Conservancy began a comprehensive archaeological investigation that eventually identified nearly 70 new habitation and mortuary sites within the refuge. In addition, subsurface floodplain sediments were examined through excavation at 750 locations, and geomorphological transect coring to bedrock elucidated other elements of sediment structure from the Illinois River westward onto the bluff base. These investigations demonstrated that the landscape was considerably more dynamic than once imagined, and that it dramatically affected human use of the area through time. Early humans constantly were required to alter their floodplain exploitation strategies to accommodate marginally habitable strips of flood-prone landscape that were seasonally inundated and frequently remodeled. Both archaeology and geology were employed determine the transformations that took place, often providing mutually supportive data to answer particular sets of questions. For instance, in determining the antiquity of the floodplain landscape, the initial appearance and distribution of archaeological remains along the shores of major water bodies accurately predicted when these paleochannels and their associated landforms developed, flourished, and died away. Recently obtained radiocarbon dates were used to confirm these assessments.

Citizen science at Emiquon: Restoring eastern bluebirds to the wetland
McGrew, Cindy. Volunteer Steward at The Emiquon Preserve

As a result of a citizen science project began in 2006, over 250 Eastern Bluebirds have fledged from nest boxes placed and monitored on the Emiquon Preserve. Ongoing data collection and casual observations are being used to design better conditions to optimize fledging rates. The project also provides informal science education and promotes interest in Emiquon for the general public.

Saving a species, one river at a time: The return of *Boltonia decurrens* to Emiquon
Mettler-Cherry, Paige* and Marian Smith+
*Department of Biological Sciences, Lindenwood University, St. Charles, MO 63301
+Department of Biological Sciences, Southern Illinois University Edwardsville, Edwardsville, IL 62025

Boltonia decurrens (Torrey and Gray), Wood (Asteraceae) is a fugitive floodplain species that colonizes disturbed sites along the Illinois River and its confluence with the Mississippi River. Without periodic disturbance, populations disappear with 3-5 years of establishment. The historic range of the species was a 400 km reach of the Illinois River that ranged from LaSalle, Il to the confluence. The species occurs as a large metapopulation; however, the altered flood regime of the Illinois River and loss of floodplain habitat have substantially reduced the size and number of populations within the metapopulation. The complex life cycle of *B. decurrens* is intimately linked with the historic flood regime of late winter-early spring flood pulses, followed by a summer drawdown period. Extensive research on the demography of the species has resulted in a clear understanding of the link between the species success and the hydrologic regime of the river. Short of restoration of the entire river and its floodplain, it will be necessary to establish and maintain populations of *B. decurrens* to serve as source populations for seed dispersal when conditions are favorable. Management of these populations should focus on the annual stages of the life cycle to maximize seed production. Our project focuses on the reintroduction of the species to Emiquon with the goal of providing an adaptable template to be used by other natural areas managers. This project is planned for 3 years and will quantify the effects of disturbance frequency on population dynamics.

The Nature Conservancy's Emiquon Preserve: Fish and aquatic vegetation monitoring, 2007-2008
Michaels, Nerissa N., Greg G. Sass, Thad R. Cook, Timothy M. O'Hara, Kevin S. Irons, and Michael A. McClelland Illinois River Biological Station, Illinois Natural History Survey, Institute of Resource Sustainability, University of Illinois at Urbana-Champaign, 704 N. Schrader Ave., Havana, IL, 62644

Abstracts *(continued)* -

The Illinois Natural History Survey's, Illinois River Biological Station has been conducting preliminary fish and aquatic vegetation monitoring at The Nature Conservancy's, Emiquon Preserve in order to evaluate relevant Key Ecological Attributes (KEA's) that were developed to determine restoration success. We used a multiple gear approach to sample the fish community in Thompson Lake July-Novemeber, 2007, and April-October, 2008. We collected a total of 1,290 fish comprised of 8 species during the 2007 sampling period, and 32,907 fish comprising 15 species in 2008. Largemouth bass Micropterus salmoides represented 90% of the total catch in 2007 with a mean of 376 bass/hour electrofishing. Largemouth bass represented 3.1% of the total catch with a mean of 100 bass/hour electrofishing in 2008. Unidentified Lepomis spp. (bluegill L. macrochirus or pumpkinseed L. gibbosus <40mm) dominated the total catch in 2008 comprising 76.5% of the total catch. Additionally, centrarchid diets were obtained non-destructively using gastric lavage to determine the emerging food web, snorkeling surveys were conducted to determine habitat usage by fish species and size classes, and largemouth bass were Floy-tagged to determine growth rates, movement, and population size in 2008. Aquatic vegetation sampling was limited in 2007 to reduce interference during the first year of growth. Aquatic vegetation was monitored monthly April-October, 2008, and showed a community composition of 14 species dominated by coontail Ceratophyllum demersum. Overall, our KEA evaluation of fishes and aquatic vegetation suggests that the Emiquon Preserve restoration has been successful for these communities to date.

Investigating nitrogen cycling during early floodplain development from a microbial community perspective

Peralta, Ariane L.*, Jeffrey W. Matthews**, Angela D. Kent***
*Program in Ecology, Evolution, and Conservation Biology, University of Illinois at Urbana-Champaign
**Illinois Natural History Survey
***Department of Natural Resources and Environmental Sciences and Program in Ecology, Evolution, and Conservation Biology, University of Illinois at Urbana-Champaign

Microorganisms drive biogeochemical transformations able to mitigate nutrient loading, but little is known about the relationship between microbial communities and ecosystem processes. Understanding the response of microbial communities to land use change is essential for restoration of wetland water quality functions. Restoration of Emiquon Preserve could potentially reduce nitrate export and improve water quality along the Illinois River. Excess nitrates from agricultural runoff can be converted to gaseous forms through the microbial process of denitrification under anaerobic conditions, whereas the process of nitrification is an aerobic microbial transformation of ammonium to nitrate. Denitrification and nitrification are sensitive to oxygen levels, and should be responsive to fluctuations in water levels in the newly restored Thompson Lake at Emiquon. The objective of this research was to investigate the link between microbial community composition and activity, specifically related to nitrogen cycling, in response to changing water levels in early floodplain development. Preliminary work on microbial function was assessed using denitrification and nitrification assays while microbial community structure was evaluated using DNA fingerprinting techniques on the total microbial community and specific microbial populations responsible for denitrification and nitrification. Denitrification and nitrification rates were highest in the most saturated sediments along the moisture gradient. Further understanding of the relationship between microorganisms and their activity in response to changing water regimes can potentially enhance floodplain management, thus, contributing to the goal of improving quality of Illinois waterways.

Science and education at the Emiquon Field Station

Purnell, M, Lemke, M. J., K. M. Miller, M. C. Cheney, J. Bonacum, H. Chen, K. Dungey, M. Kok, M. Burton
Emiquon Field Station, Lewistown, IL

The University of Illinois at Springfield opened the Emiquon Field Station in April 2008. Field station programs welcome researchers, educators and the public. Activities include sponsorship of an annual science meeting featuring science and management of the Emiquon Preserve (2007-2009), a monthly lecture at the field station, an annual Bioblitz species exploration (2006-2008) and increasing outreach activities (i.e., family weekend, star party, hosting picnic and tours). Currently our bunk space may be rented for researchers studying in the area and our classrooms and laboratories may be reserved for group activities. Online classes, Webcam, and research are supported.

Abstracts *(continued)* -

Seed limitation: Does a second seed sowing enhance succession and invasion resistance in prairie restorations?

Ramey, Justin and Amy McEuen
Biology Department, University of Illinois at Springfield

Tallgrass prairie is one of the most highly disturbed and critically endangered ecosystems in the central Illinois region. Approximately 55% of all tallgrass prairie flora are currently listed as threatened and more than 90% of the area once occupied by diverse tallgrass prairie has been modified for agricultural use. In response to this, tallgrass prairie restoration efforts are taking on the enormous challenge of finding ways to quickly develop resilient and established prairie ecological systems. The development of advanced and efficient restoration and reconstruction methods will be essential not only for the success of future prairie projects, but also for the successful development of new projects and applications. Understanding and defining successful restoration approaches can save valuable time and resources while simultaneously enhancing the potential to promote tallgrass prairie as a viable restoration option. This study will determine if a second seed-sowing event at two newly-established Emiquon prairie sites can significantly influence prairie species richness, floristic quality and rates of non-native invasion. Four N-S transects have been established, each consisting of fifteen random plot locations divided into east and west 1m2 subplots. During the 2008 growing season, all plant species within the east and west plots were identified and percent covers were estimated. In the fall of 2008, eighteen native species were selected and sown in east or west plots at each of the sixty plot locations. Plots will again be monitored for the 2009 growing season and species ID and percent covers will be recorded and statistically analyzed. If we can show that a second seed-sowing event occurring early in the restoration process significantly influences prairie species richness, floristic quality, community succession and rates of non-native invasion, we can potentially provide an expedient planting method for future research and restoration projects to follow.

Ten years of vegetation change at Spunky Bottoms

Sluis, William
wsluis2@yahoo.com, 2268 N 500 W, Angola, IN 46703

Vegetation has been monitored since the initiation of the Spunky Bottoms restoration in 1998 using plots within communities and transect across ecotones. The data depict trends for several species, some in response to hydrologic fluctuations and some to as general succession. These include dispersal and establishment of Andropogon gerardi, Sorghastrum nutans, and Phalaris arundinacea, and responses to changes in hydrology by Carex lacustris, Solidago altissima, Spartina pectinata and Typha spp.

Wetland and waterbird monitoring at Emiquon Preserve during 2008

Smith, Randy, Joshua Stafford, Aaron Yetter, Chris Hine and Michelle Horath
Illinois Natural History Survey, Forbes Biological Station & Frank Bellrose Waterfowl Research Center, P.O. Box 590, 20003 CR 1770E, Havana, IL

The staff of Forbes Biological Station monitors waterbirds and wetland habitat at Emiquon Preserve. Monitoring includes spring and fall waterfowl inventories and behavior observations, waterbird brood counts, aquatic invertebrate and moist-soil plant seed sampling, and wetland habitat mapping. We conducted waterfowl inventories and behavioral observations between 19 February and 14 April and again from 2 September and 8 December 2008. Waterfowl abundance peaked at 64,228 ducks on 10 March during spring and 34,855 ducks on 10 October during fall. During 6 passive brood observations, we encountered 111 waterbird broods consisting of 8 species. Additionally, we counted 62 broods consisting of 7 species during 2 active brood flush surveys. We collected 20 net-sweeps in shallow water 3 times during spring and summer to estimate abundance of aquatic invertebrates that breeding waterbirds consume. We also collected 20 soil cores on 3 October to estimate biomass of moist-soil plant seeds available to migrating waterfowl. During 11 to 18 September we mapped wetland habitats at Emiquon and integrated GPS data and field notes to create a wetland habitat covermap in a GIS database. We will present monitoring methods and results for 2008, compare them to results from 2007, and discuss monitoring plans for 2009.

Abstracts *(continued)* -

Developing a multimetric habitat index for wadeable stream in Illinois
Sass, Laura*, Ann Holtrop^, Leon Hinz*, and John Epifanio*
*Institute for Natural Resource Sustainability, Illinois Natural History Survey
^Illinois Department of Natural Resources, IL

Current methods for sampling stream habitat in Illinois were developed to reflect habitat as it pertains to fish or other aquatic biota. Associated indices do not directly take into account the impacts of anthropogenic disturbances such as land use on these stream habitat attributes. Furthermore, existing indices apply a single set of scoring criteria to streams statewide, which does not account for regional differences that exist under natural conditions (e.g., streams running over sand or bedrock use the same scoring criteria). One widely used habitat index in Illinois is the Qualitative Habitat Evaluation Index (QHEI) that uses many habitat metrics similar to those we are exploring. This talk will focus on the similarities and differences between the two indices. While the QHEI was developed using fish metrics to measure disturbance levels, our method of determining disturbance incorporates five different landscape level factors including road density, riparian disturbance, agricultural and urban land use, impounded water, and mined land. I will also examine similarities between variables representing substrate, in-stream cover, channel morphology, riparian and bank condition, and pool and riffle quality. Finally, I will explore the potential for incorporating regionalization into the final index. The final index will provide a useful tool for summarizing habitat information reflecting human land use and provide an integrated picture of how anthropogenic perturbations affect stream habitat metrics that influence fish, macroinvertebrates, other stream biota, and water quality.

Floodplain Restoration at Upper Ouachita National Wildlife Refuge, LA
Weber, Daniel and Steve Haase
The Nature Conservancy, 1324 N. Hearne, Suite 202, Shreveport, LA 71107

The Nature Conservancy and the U.S. Fish and Wildlife Service with partners propose to implement a phased floodplain restoration project on the Mollicy Farms Unit of Upper Ouachita National Wildlife Refuge in northeastern Louisiana. Approximately 16 miles of ring levee surround nearly 13,000 acres of existing and recently reforested former agricultural lands. The effort will selectively breach the existing Ouachita River guide levee to allow strategic reestablishment of connectivity of the river with its historic floodplain. The Conservancy will coordinate extensive water quality, flow, and biological sampling that will record the anticipated improvements to water quality and the biological community diversity and functionality after the levee is breached. Expected outcomes include a reduction in nutrients and sediments exported to the Ouachita River, a tributary of the Mississippi, and increased productivity of the existing bottomland hardwood forest resulting from a return of natural floodplain functions and processes. Private ownership of the levee by USFWS removes some of the regulatory hurdles present in similar efforts and will expedite the speed in which the project moves from the planning stage to implementation anticipated prior to September 2009. The project can be divided into four distinct but interdependent work phases: 1) design phase resulting in a plan to breach existing levees at multiple locations; 2) pre-breach baseline monitoring of water quality, flow, and biological sampling; 3) controlled breaching of the levees; and 4) a multi-year post-breach monitoring program that will record the anticipated improvements to water quality and the biological community.