

11th Annual Emiquon Science Symposium: Ten Years of Restoration

10th May 2017

Illinois State Museum at Dickson Mounds, Lewistown, IL

Abstracts for Oral Presentations

(abstracts are in the order according to the schedule)

9:10 am -- Application of Key Ecological Attributes to Assess Early Restoration of River Floodplain Habitats: A Case Study

Maria Lemke¹, James R. Herkert², Jeffery W. Walk¹, and K. Douglas Blodgett¹

¹The Nature Conservancy ²Illinois Audubon Society

The Nature Conservancy acquired the Emiquon Preserve along the Illinois River, Illinois, with the primary objective of restoring ecological floodplain processes and habitats that promote and sustain native species and communities. The Conservancy convened an Emiquon Science Advisory Council prior to restoration implementation that identified Key Ecological Attributes (KEAs) for riverine and backwater targets, KEA indicators, and acceptable ranges for those indicators. We assessed the application of this methodology to evaluate status of conservation targets and to inform future science and management at Emiquon. The KEA framework provided an important function of directing a systematic monitoring program that provided fundamental data on changing environmental conditions that were incorporated into annual target evaluations. Data show 46%-55% of all indicators were within acceptable ranges prior to reconnection of the Preserve with the Illinois River. Recent completion of a water control structure represents a critical intervention that provides potential to improve conservation status of those floodplain and riverine targets that depend on water management and river connectivity. Continued review and modification of the KEA model in conjunction with a strategic monitoring program will provide critical information to guide relevant management decisions and testable hypotheses to reduce potential threats and achieve future restoration goals.

9:30 am -- Response of Waterbirds and Wetland Vegetation to Restoration at the Emiquon Preserve...10 Years Later

Christopher S. Hine, Heath M. Hagy, Aaron P. Yetter, and Joshua M. Osborn

Forbes Biological Station

The historic importance of the Illinois River valley to waterbirds has been well-documented. Previous studies have suggested waterbird use may serve as an indicator of wetland health or a measure of restoration success. Restoration of the historic Thompson and Flag lakes, currently known as Emiquon Preserve (Emiquon), in Fulton County, Illinois began in 2007 by The Nature Conservancy. The Nature Conservancy identified key ecological attributes (KEAs) of specific biological characteristics or ecological processes to guide restoration efforts and evaluate success at Emiquon. Several KEAs at Emiquon were related to waterbird communities and their

habitats. Therefore, we monitored the response of waterbirds and wetland vegetation to restoration at Emiquon during 2007–2016 to evaluate achievement of desired conditions under the relevant KEAs. Our primary efforts included assessing: 1) abundance, diversity, and behavior of waterfowl and other waterbirds through counts and observations; 2) productivity by waterfowl and other waterbirds through brood counts; 3) plant seed and invertebrate biomass as forage for waterfowl during migration and breeding periods; and 4) composition and arrangement of wetland vegetation communities through geospatial covermapping. We present annual monitoring results in relation to desired conditions under the KEAs as a means of tracking changes in wetland conditions at Emiquon.

9:50 am -- Habitat Use of Semi-aquatic Mammals within the Emiquon Wetland Complex, Illinois

Ryan Platte and Tih-Fen Ting

University of Illinois at Springfield

Semi-aquatic mammals are a unique group of mammals that rely on terrestrial and aquatic habitats for survival. River otter (*Lontra canadensis*), muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), and mink (*Neovison vison*) all belong to this group and assume critical roles in the ecosystems as ecosystem engineers, apex predators, or indicators of ecosystem health. Previous studies on semi-aquatic mammals mostly focused on linear habitats at large geographical extents with only one or two focal species and did not investigate species interactions or temporal habitat use by semi-aquatic mammals. Therefore, we investigated the spatial and temporal habitat use by semi-aquatic mammals along with their species interactions. During March – May 2015, we deployed 30 camera traps along the shoreline of aquatic habitats within the Emiquon Wetland Complex, located in west-central Illinois. The Emiquon Wetland Complex is approximately 14,148 acres and is composed of three general habitat types – permanent wetland, moist soil impoundment, and bottomland hardwood forest. Occupancy and generalized linear modeling indicated that muskrat habitat use was negatively affected by the distance from permanent wetlands and that coyotes were drawn to areas of high muskrat use. Prey availability increased habitat use by river otters while vegetation diversity decreased their use. Mink habitat use was positively associated with beaver presence but negatively influenced by coyote presence although not coyote activity level. Muskrat exhibited a cathemeral diel activity pattern and was the only species that exhibited a temporal avoidance of another species, raccoon. Both river otter and beaver exhibited a nocturnal diel activity pattern in our study.

10:10 am -- Assessing the Emiquon Fish Assemblage in the First Decade of Restoration

Dan Gibson-Reinemer, Ollie Mendenhall, and Andrew Casper

Illinois River Biological Station

Monitoring the fish assemblage at Emiquon during the first ten years of restoration provided a rare opportunity to track changes from the inception of restoration. Here, we report major trends and changes in the fish assemblage over the first decade of restoration. The fish assemblage is thriving, with an abundant and diverse group of species present. A substantial portion of the species stocked during the first years has been detected in recent years, demonstrating the success of most species over time. There is also evidence that species are moving in and out of

the river, suggesting the connection between the lake and river fish assemblages will be an important aspect of Emiquon's second decade.

10:50 am -- Ecology of Spring-Migrating Dabbling Ducks in the Illinois River Valley

Aaron Yetter, Heath Hagy, Chris Hine, Josh Osborn, Andy Gilbert, and Doug McClain
Forbes Biological Station

Millions of waterfowl rely on Illinois wetlands during autumn and spring migration. And, harvest surveys show that gadwall (*Anas strepera*) and American green-winged teal (*A. crecca*) comprise approximately 15% of the Illinois duck harvest. Detailed information on spring distribution, habitat associations, food selection, and stopover duration for these species are lacking or antiquated. Therefore, we radiomarked 56 American green-winged teal (AGWT) and 23 gadwall (GADW) during spring 2016. Both species extensively utilized The Emiquon Preserve, especially as nocturnal roosting habitat. Mean movement distances of AGWT from day to night was 5,000.5 m (SE = 290.1, n = 136) and from night to day locations was 5,160.8 m (SE = 223.7, n = 189), respectively. Similarly, day-night and night-day movement distances for GADW were 5,649.6 m (SE = 374.1, n = 133) and 5,463.3 m (SE = 356.2, n = 159), respectively. Stopover duration during spring 2016 was 14.4 days (CI95 = 11.0-18.9 days) for AGWT and 26.5 days (CI95 = 12.1-58.3 days) for GADW. Daily survival varied by age and second-year birds had lower survival ($x\# = 0.988$, CI95 = 0.954-0.997) than after second-year birds ($x\# = 1.000$, CI95 = 0.999-1.000). We found that AGWT utilized emergent marsh (59.7%) most often while gadwall utilized wooded wetlands (44.7%) most. Our estimates of home range size (95% MCP) for AGWT and GADW averaged 2,412.7 ha (SE = 590.9) and 2,790.6 ha (SE = 703.1), respectively. In addition, we evaluated food habits of AGWT (32 male, 12 female) during spring 2016. Generally, plant material was observed more frequently (100.0%) and at a greater percent aggregate mass (74.6%) than invertebrates (59.0% and 25.4%, respectively). Notable food items occurring in AGWT diets included sedges, rice cutgrass, and smartweeds as well as chironomid larvae and aquatic worms.

11:10 am -- The art of conservation planning for waterfowl in the Midwest - Does it matter how we allocate our resources?

Joshua M. Osborn, Heath Hagy, Aaron Yetter, and J. Westervelt

State and Federal Agencies, non-profit organizations, and other entities have processes for allocating wildlife habitat resources across the landscape. For example, the Upper Mississippi River and Great Lakes Region Joint Venture establishes habitat objectives for non-breeding waterfowl in the Midwest using daily ration models to estimate energetic carrying capacity. Agencies and other conservation partners use these stepped-down habitat objectives to prioritize wetland restoration, enhancement, and creation activities. Although much progress has been made in the 30 years since the North American Waterfowl Management Plan (NAWMP) was implemented, agencies still struggle to allocate habitat conservation activities in locations and at scales where birds can respond to and maximally benefit from wetland conservation actions. We conducted research on lesser scaup (*Aythya affinis*) to develop a predictive model to simulate

their response to habitat conservation activities on the landscape. The continental lesser scaup population declined by more than 40% from the late 1970s to the mid-2000s, and currently the breeding population is still 20% below the NAWMP goal. Research indicates that poor condition of females resulting from inadequate food sources during spring migration may be contributing to reduced populations. We determined food density and foraging behavior at foraging and random locations in wetlands across the Midwest during spring migration 2012-2015 to better understand the response of lesser scaup to food densities. Using this information, we created an individual-based model to predict how lesser scaup would respond to habitat enhancement and creation along the Illinois River, an important spring migration stopover site in the Midwest. We will demonstrate how conservation planners can use this model to evaluate the habitat conservation activities before expending valuable resources to maximize benefit for lesser scaup.

11:30 am -- Return of the Osprey: “Hacking” a State-Endangered Species in Illinois

Tih-Fen Ting

University of Illinois at Springfield

Ospreys (*Pandion haliaetus*), large fish-eating raptors associated with aquatic ecosystems, were listed as endangered in Illinois in 1977. Osprey population increase and range expansion have occurred since the banning of DDT and other persistent organochlorine pesticides, and recovery efforts such as hacking. Although the first osprey hacking program in the U.S. started back in 1979, Illinois did not begin hacking ospreys until 2013. Between 2013 and 2016, 37 osprey chicks – 22 males, 11 females, and 4 unconfirmed – were translocated from the Chesapeake Bay area to three hacking locations in Central Illinois. Six osprey chicks were fitted with the PTTs between 2014 and 2016. Of those six ospreys, only one successfully reached its wintering grounds in South America, which corroborates the known fact of high juvenile mortalities among raptors. The other five PTT-tagged juveniles were lost due to predations (2), drowning (2), and one unconfirmed cause. Between 1979 and 2014, 20 states in the U.S. implemented the osprey hacking program at one time or another. On average, each program lasted more than seven years (7.5 ± 5.03 , $n = 20$) and hacked more than 93 birds (92.5 ± 91.43 , $n = 20$). Also, it took more than five years on average (5.3 ± 2.33 , $n = 11$) to have the first successful nest by a returned osprey from the hacking program. Therefore, in comparison, the osprey hacking program in Illinois is still at a relatively early stage, particularly in terms of the number of the birds hacked that is expected for a successful program.

11:50 am -- Increasing Segregation in the Emiquon Fish Assemblage Over Time

Dan Gibson-Reinemer, Ollie Mendenhall, and Andrew Casper

Illinois River Biological Station

The Emiquon fish assemblage provides an unusual opportunity to examine how the structure of a restored floodplain lake assemblage changes over time. Using monitoring data beginning in 2007, we show the co-occurrences of fish species were initially random, showing no pattern of aggregation (positive co-occurrences) or segregation (negative co-occurrences). In 2014 and 2015, however, the assemblage was characterized by a segregated pattern. We speculate that

increasing competition led species to segregate themselves. Understanding how floodplain lakes change over time, particularly in relation to their connection with rivers, will be relevant for managing these ecosystems under changing conditions.

Poster Presentations

(Abstracts are ordered by poster number)

#1 -- Marsh Bird Use of Wetlands Managed for Waterfowl in Illinois

Therin Bradshaw¹, Heath M. Hagy², and Christopher N. Jacques¹

¹ Western Illinois University ² Forbes Biological Station

Wetland management in the Midwest is often used to increase energetic carrying capacity for primarily dabbling ducks. Other conservation initiatives encourage multi-species management, but often waterfowl are a primary focal group. It is widely assumed that waterfowl management activities benefit other birds, but few studies have quantified those benefits. A key assumption of several conservation planning documents is that waterbird habitat and population objectives can be accomplished by fulfilling waterfowl habitat objectives. However, few researchers have examined the relationship between wetlands managed for waterfowl and the provision of habitat for other migratory birds. In fact, the IDNR Wetlands Campaign identifies the contribution of moist-soil management to wildlife objectives as an important information gap which requires additional research.

Overall, marsh birds are an understudied guild of wetland-associated species that can be valuable indicators of wetland health. As wetlands have declined in Illinois, likely so have marsh birds due to habitat loss. Wetlands managed for other species have the potential to provide benefits to marsh birds. For this project, we determined marsh bird use across a wide range of wetland types (e.g., emergent, non-vegetated), hydrologic regimes (e.g., seasonal, semi-permanent), management practices (e.g., active, passive, unmanaged), and past disturbance regimes in Illinois during late spring and early summer of 2015, 2016 and now 2017. Our objectives are to 1) compare marsh bird use of wetland impoundments managed for waterfowl across a continuum of management intensities and strategies to predict how these actions can increase use by both groups, 2) compare marsh bird use of restored and natural wetlands, and 3) determine characteristics of wetlands and the surrounding landscape that influence marsh bird use of restored wetlands. Additionally, we surveyed marsh birds using the standard protocols on wetlands concurrently surveyed within the Illinois Critical Trends Assessment Program (CTAP) for comparison of methodologies.

#2 -- Effects of Spring Flooding on Young of Year Centrarchidae Recruitment

Dakota Kobler, Elizabeth Dix, Daniel Gibson-Reinemer, Levi Solomon, Kristopher Maxson, and Andrew Casper

Illinois River Biological Station

The La Grange Reach of the Illinois River boasts a diverse range of habitats, including many backwaters, subject to annual flooding events. These habitats support an abundance of fish species, many of which are desired by recreational and commercial fishermen. Of specific importance to recreational fishermen are Centrarchid sportfish, which utilize the shallow backwaters as overwintering habitat and as nest building sites during spawning events. Warming water temperatures act as a trigger for spawning in the spring; however, Centrarchid sportfishes have been known to spawn throughout the summer and into early fall. Beginning in 1993, fish communities in the La Grange Reach have been monitored using a multi-gear approach as part of the Upper Mississippi River Restoration (UMRR) Program's Long Term Resource Monitoring (LTRM) element. Using these data, we analyzed trends in young of year (YOY) Centrarchid populations using electrofishing and mini-fyke data collected in backwaters from 1993-2015. In particular, we looked at patterns of recruitment among YOY Centrarchid sportfish in response to springtime flooding events.

#3 -- Preliminary Results of Electrofishing Emiquon's Water Control Structure

Olivea M. Mendenhall, Andrya L. Whitten, and Andrew F. Casper

Illinois River Biological Station

We evaluated fish composition at the Emiquon Nature Preserve's (Emiquon) water control structure. This structure allows controlled intake and discharge from Emiquon with the Illinois River. The goal of this study is to determine if there is any change in fish composition when the water control structure is operational (open) and when is not operational (closed). However, at this point in the study, we are still collecting baseline information, sampling efforts have consisted of one effort while water control structure was closed and one effort when it was opened. We sampled using pulsed DC electrofishing using Long Term Resource Monitoring (LTRM) protocols on the Emiquon side of the water control structure and the River side concurrently using two crews and consisted of three 15-minute electrofishing runs. Collecting this information will be useful in determine if and what species of fish are attempting to leave Emiquon or breach the water control structure.

#4 -- Breeding Ecology of Waterbirds in a Restored Floodplain of the Illinois River

Andrew Gilbert

Forbes Biological Station

The Nature Conservancy's Emiquon Preserve is the most substantial floodplain restoration effort to date in the region, directly restoring, enhancing, and protecting >2,700 ha of former floodplain wetlands and associated uplands in the central Illinois River valley. The restoration has provided critical nesting habitat for many waterbird species, including species of conservation concern such as least bittern, black-crowned night heron and common gallinule. Since 2013, we have

conducted nest searches in two distinct wetland vegetation communities, 1) dense emergent and 2) hemi-marsh vegetation. We evaluated nest density, nest success, and nest characteristics of marsh birds during June and July of each year. Nest density in hemi-marsh vegetation in 2016 was 1.70 nests/ha resulting in an overall estimate of 514 nests at Emiquon, compared to the four-year average of 1.00 nests/ha and an estimated total of 207 nests. Average nest survival in hemi-marsh vegetation was 58% in 2016 with a four-year average of 55%. Nest density in dense emergent vegetation in 2016 was not determined due to limited availability of this vegetation community; however, we incidentally found seven nests in this cover type. Nest density in dense emergent vegetation from 2013-2015 had an average of 1.75 nests/ha with an overall estimate of 331 nests at Emiquon. Average nest survival in dense emergent vegetation in 2016 was <1% and considerably lower than the four-year average of 48%. The addition of a water control structure in summer 2016 increased management capabilities at Emiquon Preserve and restored river floodplain connectivity. Future research will monitor the vegetation and waterbird response to evaluate the effects of river-floodplain connectivity. This multi-year research project will provide information to adaptively manage and improve Emiquon Preserve following reconnection using nesting waterbirds as an environmental indicator and sentinel of wetland quality.

#5 -- True Metabolizable Energy of Submersed Aquatic Vegetation for Dabbling Ducks

Margaret Kenna^{1,2}, Sarah McClain^{1,2}, Heath Hagy¹, Christopher Jacques², John Simpson³, and J. Brian Davis⁴

¹Forbes Biological Station ²Western Illinois University ³Winous Point Marsh Conservancy

⁴Mississippi State University

Wetlands provide critical habitat for migrating waterfowl throughout the Midwest, but more than 80% of wetlands have been lost and most others have been degraded. In particular, loss of submersed aquatic vegetation (SAV) communities has decreased foraging habitat quality for many species of waterfowl. However, there is a lack of information about the implications of these losses on energetic carrying capacity for waterfowl, especially dabbling ducks. Managers can estimate the energetic carrying capacity of wetlands by determining the energetic value of the foods available to ducks. However, most available true metabolizable energy (TME) values are derived from seeds and have only been collected for a few species of ducks. As many ducks consume both seeds and SAV, additional TME values for SAV are needed to help estimate energetic carrying capacity of wetlands in the Midwest. The objective of our study is to estimate true metabolizable energy of six species of submersed aquatic vegetation common to the Upper Midwest for dabbling ducks. TME trials for wild-caught mallards (*Anas platyrhynchos*) were completed in autumn 2016. TME trials have also been conducted with wild-caught gadwall (*Anas strepera*) on four of the six species of SAV and we are currently working on processing the excreta to determine the gross energy of the samples. Gadwall TME trials will be completed during autumn 2017. Preliminary data indicates that TME values for mallards are less than many species of seeds, but similar to many aquatic invertebrates.

#6 -- Wetland Quality for Waterbirds in Illinois

Abigail G Blake-Bradshaw¹, H.M.Hagy¹, J.W. Matthews², J. O'Connell³, and M. Eichholz³

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Waterbirds use a variety of wetland types during critical periods, such as spring migration. However, the amount wetland area in the Midwest has decreased, and remnant wetlands are often degraded and may not meet habitat needs for waterbirds. The National Wetland Inventory (NWI) is currently the most comprehensive measure of wetland quantity in this region, but unfortunately, NWI lacks data regarding the timing, depth, and persistence of surface water inundation. Therefore, current information regarding wetland quantity may overestimate wetland availability for waterbirds because many wetlands are not inundated and accessible to waterbirds during the appropriate periods.

We estimated wetland quantity for waterbirds during critical periods in Illinois and will model factors that affect wetland quality. We surveyed wetland vegetation characteristics, potential hydrologic stressors, waterbird occupancy, and management intensity on approximately 100 wetland plots (0.25 km²) during three sample periods critical to focal waterbirds (i.e., spring [migrating dabbling ducks], early summer [nesting marsh birds], late summer [migrating shorebirds]) across the state of Illinois. Within each plot, we mapped inundated area of NWI polygons (Forested, Emergent, Pond, Lake, River). Water depth and vegetation cover were assessed for each polygon type. Additionally, high-resolution aerial photographs of all plots and the surrounding area during each sample period were obtained.

During spring, less than 30% of any wetland type was flooded shallowly and accessible for foraging dabbling ducks. Likewise, emergent vegetation (<10%) and overall vegetation (<25%) were rarely inundated. Summer inundation rates were greater than spring: forested (34%) and emergent (61%). During fall, flooded area was similar to spring, but shallow inundation was slightly greater. However, mudflats, critical for shorebirds, comprised less than 20% of any wetland type.

Based on preliminary results, we conclude most wetland area assessed by the NWI in Illinois is not flooded at suitable depths for waterbirds during critical periods.

#7 -- Comparing Restoration Ecology and Conservation of the Illinois River and Rio Parana: A Course Exploring Two Rivers of International Importance

Michael J. Lemke¹, Keenan Dungey¹, and Luiz Felipe M. Vehlo²

¹University of Illinois at Springfield ²Universidade Estadual de Maringá, Maringá, Paraná, Brazil

The University of Illinois Springfield (UIS) and the Universidade Estadual de Maringá (UEM) are collaborating to offer a course series focused on one flood-pulsed river system each in the U.S. and Brazil. The U.S. study focus will be the middle reach of the Illinois River, which has undergone over 125 years of mixed degradation, conservation and restoration. The area of focus in Brazil will be the Upper Rio Paraná that has the last reach of river free of impoundments. While prolific and significant scientific studies have been conducted on the aquatic ecosystem of

the Paraná, it remains one of the most important rivers in South America because it is located in the most populous regions in Brazil and has been greatly altered by the construction of dams for hydroelectricity. Part of this educational effort will be the repeat offering of a one-semester online, bilingual course that explores conservation biology and restoration ecology. Particular attention will be given to the conservation approach to maintain and protect existing biodiversity and critical habitat and contrast this approach with that in restoration where goals are often to reverse ecosystem degradation. Thus a dynamic where one river (Illinois) is showing efforts towards restoration while the other (Paraná) endures continued degradation, offers a platform where the science, politics, stakeholders, proposals and outcomes of efforts will be probed, debated, and researched. A second, independent effort will be a student exchange to each university's field stations to gain hand on experience about the river ecology. The online course will be offered for credit in the spring at both universities with details on how to enroll provided.

#8 -- Kinetic Characterization of a Novel sPLA₂ Enzyme from the Northern Paper Wasp *Polistes fuscatus*

Jarrett M. Lindsay and Stephen R. Johnson
University of Illinois at Springfield

Secretory Phospholipases A₂ (sPLA₂) are a subtype of PLA₂ enzymes that cleave glycerophospholipids at the *sn*-2 ester bond when arachidonic acid is present. Because of the numerous downstream effects of arachidonic acid (e.g. prostaglandin/prostanoid synthesis in inflammatory signaling), sPLA₂s have received considerable attention as a potential target for drug therapy and proteomic study. Although abundant research exists on snake sPLA₂, other invertebrates have yet to be examined. Preliminary investigation using a UV-visible, synthetic substrate assay indicated Illinois-native *Polistes fuscatus* collected from the Emiquon Nature Preserve possessed a venom with highly active sPLA₂. Thus, the purpose of this investigation was to quantify *P. fuscatus* sPLA₂ kinetic activity. Isolated sPLA₂ was obtained from whole venom samples via High Performance Liquid Chromatography (HPLC). A Cayman Chemical[®] Assay Kit was used with UV-Visible spectrometry to determine sPLA₂ kinetic parameters. Linearization of Michaelis-Menten was performed using the Hanes-Woolf plot in Microsoft Excel[®]; from this plot, it was possible to obtain the K_m and V_{max} of the enzyme.

#9 -- Acid and Base Scarification Promote Germination in Three Forbs of the *Baptisia* Genus

Jack Zinnen, Amy B. McEuen, and Marc Klindshirn
University of Illinois at Springfield

Prior research has demonstrated acid scarification as a means to overcome prairie seed dormancy. Both acid and base scarification were utilized in three species in the Wild Indigo (*Baptisia*) genus (*B. alba*, *B. australis*, and *B. bracteata*). Seeds were scarified in concentrated 98% sulfuric acid or 1M NaOH for different time intervals (20, 40, 60, and 90 min) to yield germination within 21 days following exposure. Scarification time was demonstrated to influence germination rates within the test period. However, scarification responses varied among the three species and suggesting higher seed recalcitrance in *B. alba* and *bracteata* compared to *B. australis*. Results indicated acid scarification treatment was superior ($p < 0.1$) to

the methods utilized in base scarification for all three species. Base scarification failed to consistently break dormancy (<15%) unless *B. australis* seed was used. Overcoming dormancy in the other two species may require the use of stronger bases. For potential commercial use, optimal acid exposure times can yield high (>35%) germination in all three species. These data support prior findings confirming that chemical scarification can produce fast and reliable germination of otherwise difficult species.

#10 -- A Longitudinal Study on the Floristic Quality of the Emiquon Preserve's Tall Grass Prairie Reconstruction

Sarah Lindholm, Jack Zinnen, and Amy McEuen

University of Illinois at Springfield

#11 -- Emiquon Preserve 2017-18 Work Plan and Use Areas

Tharran Hobson, Sally McClure, Denim Perry, and Mark Jones

The Nature Conservancy

Each season TNC stewardship staff performs various invasive plant control projects including mechanical, chemical, and prescribed fire. This poster highlights planned and recently carried out efforts to assist researchers in planning for upcoming projects and field work. Proposed work plans are focus areas and may not indicate unforeseen plant management projects. Areas highlighted for prescribed fire are subject to availability of resources and weather.