

RESTORATION NEWS MIDWEST

Newsletter of the Midwest-Great Lakes Chapter of the Society for Ecological Restoration International – July 2009, Volume 2, Issue 1

A NEW YEAR AND NEW GOALS

As we begin the second year of the Midwest-Great Lakes SER Chapter I am inspired and motivated as I think back on the great success of our First Annual Meeting and the enthusiasm of all in attendance. The Executive Board of the Midwest-Great Lakes SER Chapter held its first monthly conference call in June to discuss goals for the coming year. Some of the goals we discussed were operational goals – goals set to ensure the operation of the Chapter in the future and to assist with officer transitions. However, in my view the important goals during these formative stages are those that increase our services to our Chapter Members and those that provide members with opportunities to become involved with Chapter affairs.

Some of the current benefits of Chapter membership include our webpage, listserve, newsletter, and the Annual Chapter Meeting. The Chapter webpage is intended to communicate key events to our members and the public. We will make timely updates to the Chapter webpage throughout the year and are planning to begin the process of making it a webpage that will serve as a resource for ecological restoration in the Midwest. The Chapter Listserve was set up to enable Chapter members to communicate with each other throughout the year. Additionally, the Chapter Listserve is the method that the Chapter Officers use to provide its members with updates on Chapter activities. Thus, we encourage everyone to subscribe to this free moderated listserve. We are also planning on producing at least two newsletters this year with interesting articles and chapter updates. If you have ideas or would like to contribute to the Chapter newsletter don't hesitate to email me with your ideas.

Our biggest activity this year will be the Second Annual Chapter Meeting. We have already started making plans for next spring.

Committees provide Chapter members with opportunities to contribute to the Chapter's development and ongoing activities. The committees are: 1) Annual Meeting Committee; 2) Communications Committee; 3) Membership Committee; 4) Subregional Local Restoration Committee, 5) Board Development Committee; and 6) the Awards Committee. The Annual Meeting Committee will work with Chapter Officers to plan and hold the Annual Chapter meeting. The Communications Committee will be responsible for communicating chapter news and activities. Specifically, the Communications Committee will consist of the Webpage Subcommittee and the Newsletter Subcommittee. The Webpage Subcommittee will maintain the Chapter webpage and the Newsletter Subcommittee will produce *Restoration News Midwest*. The Subregional Local Restoration Committee will develop a working list of organizations involved with ecological restoration within the Chapter boundaries. The Board Development Committee is responsible for Chapter Elections, assisting with orientation of new officers, and identifying nominees for the Chapter Elections. The Awards Committee will identify individuals or institutions worthy of recognition and will be responsible for presenting these awards. Please contact me via email (smiley.50@osu.edu) if you are interested in volunteering on any of these committees.

Rocky Smiley, President

HIGHLIGHTS FROM THE FIRST ANNUAL CHAPTER MEETING

The first Annual Meeting of the Midwest-Great Lakes SER Chapter was held Friday April 24 to Saturday April 25, 2009 at Marian College in Indianapolis, Indiana. It was a fantastic event and one could not imagine a better way to mark the beginning of the newest SER Regional Chapter. Ninety-eight attendees from Ohio, Michigan, Indiana, Illinois, Wisconsin, Kentucky, New York, and Ontario attended a very productive two day meeting that consisted of a keynote presentation, 13 poster presentations, 36 oral presentations, the second chapter business meeting, a plenary presentation, and two field trips.

The festivities began with a wine and cheese social held in conjunction with the poster session and sponsor exhibits on Friday evening. After dinner Dr. Alan Unwin, the Midwest U.S./Canada SER Board representative, gave an update from the SERI Executive Board that expressed their support and the importance of the role Regional Chapters will play as SERI expands its international focus. Dr. William R. Jordan then gave the keynote presentation entitled “An Amazing Grace: the Midwestern Prairies and the Invention of Ecological Restoration”. Dr. Jordan provided an excellent overview on the evolution of ecological restoration.

On Saturday the day began with the second business meeting. Sean Clauson announced the results of the first Chapter elections and the remainder of the business meeting was spent discussing the proposed Chapter Bylaws. Members commented on different aspects of the bylaws and the Executive Committee will incorporate these suggestions into the bylaws. The remainder of the morning was devoted to the oral presentations. Lunch time was a good

opportunity for further networking and to recognize members of the Organizing Committee and for the group to discuss potential meeting locations for our second Annual Meeting. Following lunch was another round of oral presentations. The afternoon plenary presentation “Marian College Ecolab: a Case Study of a 90 year old Environmental Restoration” was given by Dr. Robert E. Grese and Dr. David P. Benson. The plenary presentation provided insightful information about the Marian College Ecolab and was a great start for the Ecolab Tour. The day concluded with a field trip led by Don Miller to the Eagles Crest Woods Nature Preserve where participants enjoyed viewing the springtime flowers that were in bloom within an old-second growth forest.

We extend a sincere thank you to all of our sponsors (ENVIRON International Corporation, Genesis Nursery, Marian College, Stantec, Eco Logic, Hoosier Aquatic Management Inc., JFNew, SEH Inc., Shirley Heinze Land Trust, The Nature Conservancy-Indiana, Christopher B. Burke Engineering, Ltd., Flatland Resources, Spence Restoration Nursery) for their generous support of our First Annual Meeting. We are also grateful to all who attended and participated in the meeting because it would not have been a success without your participation. We also thank other members of 2009 Annual Meeting Subcommittee (Dave Benson, Benjamin Eddy, Pamela Rice, Carl Wodrich), the other members of the Organizing Committee (Hua Chen, Young Choi, Cody Fleece, Bob Grese, Cara Hardesty, Liam Heneghan, Jason Husveth, Wesley Ket, Anne Remek-Kominowski, John Shuey) and all who assisted with onsite preparations (Ginny Smith, Jody Nicholson, Katie Martin, Belynda Smiley, Sean Clauson) for all of their contributions.

*Rocky Smiley, President and
Jennifer Lyndall, Vice-President*



Allison Mansion



Friday night registration



Sponsorship exhibits



Poster session



Attendees enjoying dinner



Alan Unwin gives a report from SERI



Bill Jordan giving his keynote presentation on Friday



Business Meeting on Saturday



Recognition of the Organizing Committee Members



Jennifer Lyndall introduces Dave Benson and Bob Grese prior to their plenary presentation



Ecolab Tour



Field trip to the Eagles Crest Nature Preserve

RESTORED NATIVE PLANT COMMUNITIES THRIVE AT THE PRAIRIE BORDER SOUTH PRESERVE

The Prairie Border South Preserve consists of 1.3 km² of sand savanna, restored prairie and wetland in Jasper County, Indiana at the southwest corner of Jasper-Pulaski State Fish and Wildlife area. The property was purchased in 2003 by the Indiana Chapter of The Nature Conservancy. Around 50% of the property was in row crop agriculture at the time of the purchase. The property is located in the Kankakee Sand Section of the Grand Prairie Natural Region about 11 km south of the Kankakee River. The scattered Prairie Border tracts and Jasper Pulaski Fish and Wildlife Area form one of the richest botanical sites and one of the highest quality and largest examples of oak savanna in Indiana.

The Nature Conservancy wished to restore the agricultural fields to prairie and marsh in order to reestablish the savanna, prairie, and wetland mosaic to improve viability of these rare habitats at the site. Almost all of the wet and mesic prairie habitats in northwestern Indiana have been converted to agriculture, and this component of the mosaic is sorely lacking from the site. The Jasper-Pulaski State Fish and Wildlife Area is also known for its amphibian community, and new breeding pools would provide additional habitat for the state-listed species found in the area. In addition, agricultural drainage lowers the water table below adjacent oak savanna habitats and reduces the internal complexity of these areas. Restoring the water table below these habitats would also restore the seasonal hydrology needed to maintain these ecosystems.

The Prairie Border South Preserve was enrolled in the Natural Resource Conservation

Service's Wetland Reserve Program. The Wetland Reserve Program provides funds for hydrological and botanical restoration with the purchase of a permanent easement.

The hydrology of the site was restored first. When acquired, the agricultural fields were extensively drained by a network of agricultural ditches. The initial goal was to eliminate all agricultural drainage, but the largest ditch is critical for maintaining roadside drainage and had to be retained. A flow control structure was installed in this ditch to retain as much water as possible and still provide the needed drainage. Where possible this drainage ditch was also reconstructed into a meandering, slow-flowing wetland through habitats intended to become wet and mesic prairie habitat. Flow in the other smaller ditches was eliminated by filling in and re-sculpting to create complex patterns of shallow depressions. Trees that lined the ditches were eliminated to increase the functional size of wetland and prairie restoration for breeding grassland birds. Ditches that followed the edges of savanna could not be completely filled in unless we performed extensive assessments for cultural artifacts prior to construction. We used simple ditch plugs in these ditches using soil pulled exclusively from the adjacent agricultural fields. Following hydrological restoration, these ditches formed water-filled linear pools, but no longer drained water from adjacent fields.



Emergent pools created following filling of ditches

Spence Restoration Nursery developed seed mixes for several different agricultural fields of varying soil type and moisture level. Based on these conditions, three seed mixes were devised for dry sand, mesic sand, and wet loamy sand (Table 1). These mixes intended to create a reasonably species rich native mosaic over the site that would kick-start an ecological trajectory to fuller recovery as plant and animals colonized from adjacent natural habitats.

A dry sandy field enclosed by the savanna was sown with a dry prairie mix containing a heavy component of little bluestem (*Schizachyrium scoparium*) (Table 1), the dominant grass of sandy openings in this area. A light mix of forbs was included in this area with the thought that the surrounding savanna would provide a source for additional forb diversity. This dry field was not suitable for wetland restoration, so no earthwork was performed. The field was dormant sown with a prairie seed mix late in the fall of 2003. Long term management of this field may include permitting the oaks from the surrounding savanna to encroach to reduce the sharp defined edges that resulted from cultivation.



Established dry prairie as of the fourth growing season

A field in the northwest corner of the property was sown with a mesic prairie mix for sandy soil. This mix contained typical species of the mesic prairie including the major warm season grasses, especially little bluestem and

a mix of 17 forbs (Table 1). The water table was close enough to the surface for some wetlands to be excavated in this field. The Nature Conservancy also spread the wet seed mix around excavated wetlands.

Table 1. Seeds mixes used at the Prairie Border South Property.

Grasses and Sedges	Dry Prairie (oz/acre)	Mesic Prairie (oz/acre)	Wet Prairie (oz/acre)
<i>Andropogon gerardii</i> (Big Bluestem)	8.00	16.00	16.00
<i>Carex annectans xanthocarpa</i> (Yellow Fox Sedge)			0.25
<i>Carex frankii</i> (Frank's Sedge)			3.25
<i>Carex hystericina</i> (Porcupine Sedge)			0.13
<i>Carex lurida</i> (Lurid Sedge)			0.13
<i>Carex scoparia</i> (Lance-Fruited Oval Sedge)			0.25
<i>Carex vulpinoidea</i> (Fox Sedge)			0.5
<i>Elymus canadensis</i> (Canada Wild Rye)	27.00	32.00	32.00
<i>Elymus virginicus</i> (Virginia Wild Rye)			16.00
<i>Glyceria striata</i> (Fowl Manna Grass)			0.40
<i>Juncus canadensis</i> (Canada Rush)			0.03
<i>Juncus effusus</i> (Soft Rush)			0.03
<i>Juncus torreyi</i> (Torrey's Rush)			0.02
<i>Koeleria cristata</i> (June Grass)	0.66		
<i>Leersia oryzoides</i> (Rice Cut Grass)			1.40
<i>Panicum virgatum</i> (Switchgrass)	2.66	1.30	1.40
<i>Sorghastrum nutans</i> (Indian Grass)			8.00
<i>Schizachyrium scoparium</i> (Little Bluestem)	32.00	28.00	
<i>Sorghastrum nutans</i> (Indian Grass)	5.30	8.00	
Forbs			
<i>Asclepias incarnata</i> (Marsh Milkweed)			0.13
<i>Aster azureus</i> (Sky Blue Aster)	0.50		
<i>Aster ericoides</i> (Heath Aster)	0.33	0.30	0.13
<i>Aster novae-angliae</i> (New England Aster)		0.60	0.40
<i>Aster sericeus</i> (Silky Aster)	0.42		
<i>Aster umbellatus</i> (Flat-topped Aster)			0.13
<i>Baptisia leucantha</i> (White False Indigo)		0.30	
<i>Cassia hebecarpa</i> (Wild Senna)		1.30	1.00
<i>Coreopsis tripteris</i> (Tall Coreopsis)		1.30	1.00
<i>Eupatorium perfoliatum</i> (Boneset)			0.13
<i>Eryngium yuccifolium</i> (Rattlesnake Master)		1.30	1.00
<i>Helianthus grosseserratus</i> (Sawtooth Sunflower)			0.50
<i>Helianthus mollis</i> (Downy Sunflower)	0.66	0.15	0.20
<i>Helianthus occidentalis</i> (Western Sunflower)	0.33		
<i>Liatris spicata</i> (Dense Blazing Star)		0.30	0.40
<i>Monarda fistulosa</i> (Bergamot)	1.00	0.30	0.25
<i>Parthenium integrifolium</i> (Wild Quinine)	1.00	1.30	1.00
<i>Penstemon digitalis</i> (Foxglove Beardtongue)		1.30	1.00
<i>Potentilla arguta</i> (Prairie Cinquefoil)	1.00	0.30	
<i>Pycnanthemum virginianum</i> (Mountain Mint)		0.30	0.25
<i>Ratibida pinnata</i> (Yellow Coneflower)	1.00	1.30	1.00
<i>Rudbeckia subtomentosa</i> (Sweet Black-Eyed Susan)			0.50
<i>Silphium integrifolium</i> (Rosinweed)		1.30	1.00
<i>Silphium terebinthinaceum</i> (Prairie Dock)		0.15	0.40
<i>Solidago nemoralis</i> (Gray Goldenrod)	0.33		
<i>Solidago riddellii</i> (Riddell's Goldenrod)			0.70
<i>Solidago rigida</i> (Stiff Goldenrod)	1.00	0.30	0.80
<i>Solidago speciosa</i> (Showy Goldenrod)	0.40		
<i>Vernonia fasciculata</i> (Smooth Ironweed)			0.10

The largest area of agriculture fields consisted of flat wet soils at the southern edge of the property. These fields contained excellent opportunities for wetland restoration due to the abundance of drainage ditches, the high water table, and the wetland soil type. Once the hydrologic restoration was completed, the area reverted to a complex wetland with expansive seasonal flooded areas with scattered shallow wetland pools embedded throughout the tract.

The seed mix for this field contained elements of mesic prairie, wet prairie, and sedge meadow. This diverse wet prairie mix contained six sedges, three rushes, seven prairie and wetland grasses and 22 forbs (Table 1). Plugs of blue joint grass (*Calamagrostis canadensis*) and prairie cordgrass (*Spartina pectinata*) were also installed along the edge of the wetlands. The tiny seeds of rushes (*Juncus* spp.) were packaged separately to be hand spread around the edges. The balance of the seed mix was broadcast sown.

The mesic and wet sections of the property were sown in the spring of 2005. The wetland hydrology was excellent, with considerable shallow standing water in the meandering channels and basins. Particularly impressive were large areas of shallow standing water in the eastern portion of the wet fields. Here, nearly 0.08 km² holds 0.03 to 0.10 m of water during the first half of the growing seasons. Sedges in this seed mix have done exceptionally well in this area along with forbs such as swamp milkweed (*Asclepias incarnata*) and boneset (*Eupatorium perfoliatum*), creating an impressive sedge meadow. Plugs of tussock sedge (*Carex stricta*) were also added in the spring of 2008.



Diverse sedge meadow

All seeded areas have performed well, with nearly every species in the seed mix found somewhere within the restoration. Diligent stewardship has maintained the integrity of the restored prairie and wetland communities at the site. Several prescribed fires have hastened the development of these restorations. Additionally, aggressive control of invasive plant species, especially *Typha* spp., has prevented them from gaining a foothold in the restorations.

The proximity of this property to Jasper-Pulaski Fish and Wildlife area presents several unique opportunities for the restoration. It is literally surrounded by populations of rare plants and animals including many disjunct plants of the Atlantic coastal plain. The restoration was designed to recreate habitats dominated by the sandy soils and fluctuating water tables. Rare wetland species such as brown beak rush (*Rhynchospora capitellata*), tall horned beaksedge (*Rhynchospora macrostachya*) and meadow beauty (*Rhexia virginica*) have already appeared in significant numbers. We expect to see many other rare plants appear as well, either through emergence from the seed bank, or through dispersal, perhaps on the feet of the hundreds of waterfowl that stage at the restoration each spring. The Nature Conservancy will continue to enrich the site

with small seed lots drawn from adjacent natural habitats.

The habitat has already become popular with several grassland bird species, particularly Henslow's sparrow and sedge wrens that abound in the mesic and wet prairies in the summer. Amphibians, particularly northern leopard frogs, have also thrived by the thousands in the newly created habitat.

The Jasper-Pulaski State Fish and Wildlife Area is perhaps best known in the Midwest as the stopover and staging point for nearly the entire eastern population of the Greater Sandhill Crane. In October, over 30,000 of these birds roost in the refuge fields at night. These cranes feed in the agricultural fields and wetlands surrounding the refuge. These cranes have been observed using the Prairie Border South Preserve for feeding and roosting. It is hoped that they will someday nest in property's wetlands.



*Greater sandhill cranes
(Photo Robert Wright)*

The success of the restoration of the Prairie Border South property is a result of the partnership between The Nature Conservancy, the Natural Resources Conservation Service, and Spence Restoration Nursery. The Nature Conservancy's commitment to stewardship of

the site will continue to serve as example of successful ecological restoration.

Kevin Tungesvick, Spence Restoration Nursery, and John Shuey, The Nature Conservancy

U.S. EPA'S GREAT LAKE'S RESTORATION INITIATIVE

The Great Lakes and their adjacent watersheds are important natural resources that provide critical ecosystem services for many communities in the midwestern United States. Yet, the Great Lakes and much of the surrounding ecosystems have been impacted by industrial, residential, and agricultural development. There are many national and international partners ranging from government agencies to tribal to local non-profits to industry partners all committed to the goal of protecting and restoring the Great Lakes and its watersheds.

To assist with restoration efforts in the Great Lakes, the President's proposed FY 2010 budget includes \$475 million to be given to the U.S. EPA for the Great Lakes Interagency Restoration Initiative

(<http://www.epa.gov/glnpo/glri/index.html>). This initiative will support federal projects and provide funds for grants and funding agreements to continue the work already started by the Great Lakes Interagency Task Force (IATF). The IATF has developed a plan for this initiative to ensure it targets those areas of significant concern for the Great Lakes region and to meet the long term goal of providing healthy ecosystems, fishable and swimmable waters, and safe drinking water. The U.S. EPA has already provided a funding guide for those interested in applying for grants and hopes to begin receiving proposals this summer and to begin issuing the grants by December 2009.

The U.S. EPA has planned a series of stakeholder meetings that will be open to the public. The goal of these meetings is to provide the public with information on current plans for implementing the Great Lakes Interagency Restoration Initiative and an opportunity to provide the U.S. EPA with feedback on how to ensure the effectiveness of this initiative. Additionally, the U.S. EPA is also using these meetings to learn about restoration activities being pursued by other institutions. These two hour meetings will be held in Chicago, Illinois; Merrillville, Indiana; Lansing, Michigan; Duluth, Minnesota; Rochester, New York; Cleveland, Ohio; Erie, Pennsylvania; and Milwaukee, Wisconsin between July 21 and August 4, 2009.

The deadline for providing comments and information is August 19, 2009. For those who not able to attend the stakeholder meetings the U.S. EPA has an online form that one can use to provide comments and suggestions

(<http://www.epa.gov/glnpo/glri/outreach.html>). Additionally, one can send their comments and information via mail to USEPA Great Lakes National Program Office (G-17J), Attention: Anthony Kizlauskas, 77 West Jackson Blvd., Chicago, IL 60604.

This initiative has the potential to have a positive impact on the Great Lakes if it is done right. So take advantage of the opportunity and provide the U.S. EPA with your comments and information about the restoration projects that you are conducting.

*Anne Remek-Kominowski, Indiana
Department of Environmental Management*

RESTORATION AS A KEY STRATEGY FOR GREEN INFRASTRUCTURE PLANNING IN CHICAGO

The role of green infrastructure in facilitating energy flows and material exchanges that sustain human habitation in urban regions is becoming more apparent and its importance for long term urban planning is being increasingly recognized. Open space planning (i.e., parks, wildlife corridors, urban forests) has long been on the agenda of urban designers. In contrast, green infrastructure serves as a way of framing discussions about the future of the city so that green spaces in are presented alongside engineered structures (i.e., roads, bridges, sewers) in urban areas so both can be simultaneously regarded as providing vital environmental services. Green infrastructure gives metropolitan planners and engineers a greater range of tools for mitigating urban problems. Additionally, if more extensive green space is planned and protected in metropolitan areas then this increases the opportunities for biodiversity conservation. Thus, green infrastructure combines several seemingly disparate environmental strategies such as increasing ecosystems services, enhancing biodiversity conservation, and bringing a landscape ecological perspective to the management of urban regions where open space is no longer considered as isolated fragments.

We provide a definition for green infrastructure as this is a relatively new term and is used inconsistently. However, we demonstrate the usefulness of the term “green infrastructure” as a way of integrating several aspects of an urban ecological strategy. In particular, we argue that restoration is a critical tactic in achieving functional green infrastructure in large metropolitan areas where degraded ecosystems are often assailed by multiple stressors. We illustrate progress

made in the Chicago area in developing a green infrastructure vision, and suggest a number of key knowledge gaps, attention to which may increase our ability to translate this vision into a reality.

Green Infrastructure Defined

We define green infrastructure as the ecological features of a human settlement that may be considered alongside traditional engineered infrastructure to enhance ecological values and functions. Usually green infrastructure is deployed for the benefit of the resident human populations although in the cases of natural areas conservation the supposed benefit for people may be an indirect one. This broad definition captures the range of uses to which the term has been applied, from those structures and processes that augment urban storm flow systems (Anon. 2008) to interconnected natural areas that contribute to human welfare (Benedict and McMahon 2006). Green infrastructure builds on previous work on ecosystems services, urban natural capital evaluation, and open space protection by integrating these insights explicitly into land-use planning in partnership with others involved in urban planning.

Since much open space in urban areas is currently either low diversity turf grass or degraded semi-natural land, restoration may be a key ingredient in increasing the ecological functioning of this land where the potential of this land to serve as green infrastructure is recognized and thus has been incorporated into urban planning. In order to provide a city with services required to augment, and in some cases replace, elements of gray infrastructure, the rehabilitation or restoration of open space will often be required.

Green Infrastructure Planning in Chicago

We discuss three plans for enhancing green infrastructure in the Chicago region. The plan entitled “Adding Green to Urban Design” is one adopted by the City Plan Commission in November 2008. This plan considers green design solutions for exterior elements of the city (building exteriors to roadways) and is primarily focused on core metropolitan areas. The second is the “Chicago Nature and Wildlife Plan” prepared by the Department of Planning and Development and the Mayor’s Nature and Wildlife Committee. The plan identifies in its Chicago Nature Area Directory about 19 km² of natural or semi-natural habitat in the city, and indicated the approaches needed to enhance their wildlife value. The third plan is the Chicago Wilderness Green Infrastructure Vision. This vision is focused on the entire Chicago Wilderness region that encompasses southern Wisconsin, northern Illinois, northwestern Indiana, and southwestern Michigan. The three plans collectively can be seen as a comprehensive and integrated green infrastructure plan for Chicago and its hinterlands. Ecological restoration is an increasingly prominent tactic endorsed in the plans as one migrates from the city core to the exterior. Ecological restoration is not mentioned in bringing green solutions to the urban cores, but is an important technique in the Wildlife Plan and in the Chicago Wilderness Green Infrastructure Vision.

Adding Green to Urban Design

“Adding Green to Urban Design” is a plan addressing three questions. Why have a plan? What needs to be done? How can the plan be implemented? Green urban design is advocated as the central tool to augmenting the considerable environmental advantages of compact, mixed-use, dense urban living. By building on the compactness and density of Chicago’s city form green design can contribute to the enhancement of quality of

life and mitigate some of the consequences of impending climate change. Chicago can legitimately claim leadership in green design with its well supported urban forestry program, more than 250 buildings with “green” roofs, and with Chicago River sufficiently improved in water quality to sustain 60 fish species. The plan recommends building on these successes with four approaches: design and maintenance directed at ensuring sustainability and environmental function; promoting design responsive to neighborhood context; testing, evaluating and expanding used of green technologies; and promoting an understanding of the rationale for and outcomes from green design among all relevant stakeholders.

In each of four categories water, air, land, and quality of life the plan explicates existing problems and elucidates the green solutions. The intended outcomes are as follows: 1) for water – capture and use precipitation and encourage water conservation; 2) for air – improve air quality; 3) for land – preserve and expand the quality and function of vegetated surfaces; 4) for quality of life – improve safety and public health and engage people in the outdoor environment. The responsible parties and a time line for achieving the outcomes are identified for each of the twenty-one key actions listed in the plan.

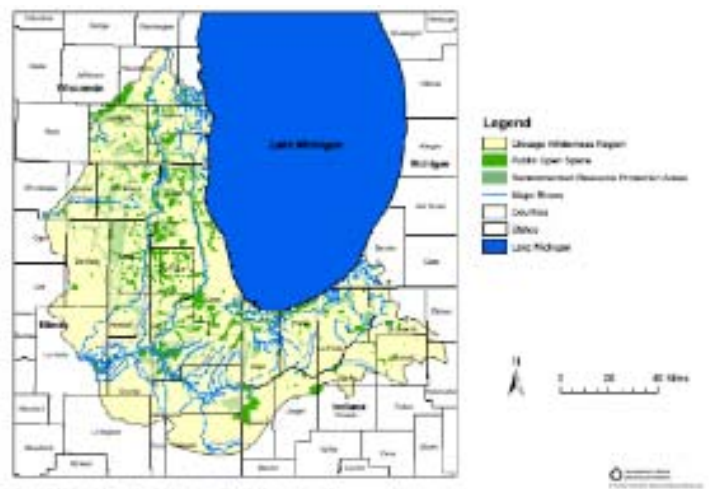
Chicago Nature and Wildlife Plan
Chicago’s Department of Planning and Development estimated that about 2.5% of the city’s land can be regarded as wildlife habitat. These habitat areas are distributed across 97 sites and contain representatives of most of the major regional habitat types. These natural areas are especially suited in providing opportunities for bird conservation. Yellow-headed black birds and black-crowned night herons nest in the area, and improved habitat may boost their population numbers and assist in reversing the declines

of other rare species. Chicago is also a significant stop-over on the migratory routes of many bird species with about 7 million birds from 300 species migrating through the city every year. The objective of the Nature and Wildlife plan is to: 1) protect natural habitat; 2) manage existing open spaces; 3) monitor sites and compile research; and 4) educate the public.

The commitment to management of degraded city habitat in order to enhance the potential for biodiversity translates into an aspiration to implement existing management plans for the largest, high quality natural terrestrial areas. Similarly, the extension of successful wetland restoration strategies city-wide is advocated, along with the endorsement of an array of restoration-oriented and biodiversity-friendly practices.

Chicago Wilderness Green Infrastructure Vision

The objective in developing Chicago Wilderness Green Infrastructure Vision (GIV) was to map existing green infrastructure and to identify opportunities to expand this system and connect fragmented sites. The GIV builds upon the Chicago Wilderness Biodiversity Recovery Plan. Because the GIV project resulted in the production of a series of regional maps it can be viewed as



The region covered by the Chicago Wilderness Green Infrastructure Vision

way of extending the utility of the recovery plan by making it visually accessible and arresting. Because the vision is regional in scope and identifies several substantial “resource protection areas”, the GIV integrates and endorses ongoing local efforts and aggregates them in a way that underscores the case for landscape level biodiversity planning.

Importantly, the GIV is not an acquisition plan, nor does it dictate conservation designs for individual sites. However, the GIV does identify useful protection techniques that can be deployed at a site scale, such as conservation easements, greenway connections, conservation development, and ecological restoration. Acquisition and conservation easements are effective ways of recruiting land into regional green infrastructure. Greenway connection is also identified as important for enhancing biodiversity value. Conservation development is a key to managing the urban/suburban context in which these protection areas are located. Finally ecological restoration is seen as a critical tool for enhancing the long-term health of the resource protection areas. This emphasis of restoration as critical management tool is consistent with the long term goal of the Biodiversity Recovery Plan.

The GIV is primarily focused on enhancing biodiversity. The definition of green infrastructure used in that project is a relatively narrow one where it is regarded as the “interconnecting network of lands and water that provides habitat for diverse communities of native flora and fauna at the regional scale”. Furthermore this definition of green infrastructure also includes areas adjacent to and connecting these remnant natural communities that provide buffers and opportunities for ecosystem restoration.

It is especially striking that the development principals enunciated by the GIV are consistent with green infrastructure strategies that might be undertaken merely to enhance ecosystem services. For instance, the overall goal is to promote development that protects and improves the natural environment. Twenty-five development principles are provided and recommend practices such as natural drainage, stormwater retention, natural landscaping, and riparian buffers. Conservation development throughout the area can be endorsed on the grounds that it costs less than traditional development and enhances property values, ecosystems services, and quality of life.

Concluding thoughts

Green infrastructure is a term that unites discourse of the pragmatic business of addressing the major challenges of providing for the health and welfare of urban dwellers with the traditionally more ethically and aesthetically matters of maintaining biodiversity in urban areas. Restoration is a vital tool for the “Chicago Nature and Wildlife Plan” and the “Chicago Wilderness Green Infrastructure Vision”, whereas novel green design is advocated by the “Adding Green to Urban Design Plan”. We believe these three plans bring together elements of what can be regarded as a green infrastructure for the entire region. Looking at these three separate initiatives in this way allows the links and synergies between the plans to be highlighted and built on. For example, green design solutions are vitally important for regulating storm flows and the protection of green space is also an important strategy in this regard as is the protection of wetland ecosystems in the region as a whole. Additionally, as metropolitan areas expand providing space for biodiversity in the city core using green roofs or similar techniques, providing natural areas within the city and larger habitat blocks around the city in its

hinterland are all a necessary part of a comprehensive approach to maintaining biodiversity into the future.

A major question in the integration of these plans to provide a comprehensive regional green infrastructure plan will depend on the degree to which green infrastructure designed with habitat quality in mind is synergistic with green infrastructure designed to directly enhance ecosystem services. Another way of asking the question is that “can restoration or rehabilitation techniques simultaneously maximize ecosystem services *and* maximize the outcome for traditional species conservation programs?” If there are few trade-off between these two objectives the future may be bright for urban areas.

Acknowledgements

We thank Aaron Durnbaugh, Deputy Commissioner of Environment, Chicago, for cogent remarks on a draft on this article.

References

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SELECTED CONTENTS OF THE JUNE 2009 ISSUE OF *ECOLOGICAL RESTORATION*

Ecological Restoration is the oldest publication to deal exclusively with ecosystem restoration and is published for the University of Wisconsin-Madison Arboretum by the University of Wisconsin Press and in association with the SER International. Below are selected Restoration Notes and Articles from the June 2009 issue.

Restoration Notes

T. B. Simpson. Restoring native sedge meadow vegetation with a combination of herbicides (Illinois).

E.G. Booth, S.P. Loheide, II, and R.D. Hansis. Postsettlement alluvium removal: a novel floodplain restoration technique (Wisconsin).

Articles

J. Truett and M. Phillips. Beyond historic baselines: restoring Bolson Tortoises to Pleistocene range.

J.P. Olfelt, D.P. Olfelt, and J.L. Ison. Revegetation of a trampled cliff-edge using three-toothed cinquefoil and poverty grass: a case study at Tettegouche State Park, Minnesota.

K. McEachern and K.Niessen. Uncertainty in georeferencing current and historic plant locations.

H.E. Pérez, F.Almira, and M. Brennan. Germination timing and dormancy break in seeds of summer farewell (*Dalea pinnata*, Fabaceae).

B.V. Iannone, III, C.J. Rosen, and S.M. Galatowitsch. Soil nitrogen concentrations in

a restored sedge meadow wetland affected by the application of high C:N amendments.

For more information on current and past issues of Ecological Restoration see:
<http://www.ecologicalrestoration.info/firstpage.html>

UPCOMING ECOLOGICAL RESTORATION RELATED CONFERENCES – AUGUST TO DECEMBER 2009

Midwest Oak Savanna and Woodland Conference, Sylvania, OH, July 29 to August 1, 2009.
<http://www.oakopen.org/news/display.asp?id=272>

“Where Science and Engineered Technologies Meet the Needs of Society” - The First International Congress on Sustainability Science and Engineering, Cincinnati, OH, August 9 to August 12, 2009.
<http://www.aiche.org/IFS/Conferences/index.aspx>

Visions of a Sustainable Mississippi River Conference, Collinsville, IL, August 10 to August 13, 2009.
<http://www.conferences.uiuc.edu/mississippiriver/>

5th Annual Great Lakes Restoration Conference, Duluth, MN, September 10 to September 11, 2009.
<http://www.healthylakes.org/09conference/>

"Native By Design" Native Gardening Conference, University of Wisconsin Madison, WI, September 13, 2009.
<http://uwarboretum.org/news/singlePost.php?id=280&origin=news>

International Conference on Ecology and Transportation, Duluth, MN, September 13 to September 17, 2009.

<http://www.icoet.net/ICOET2009.asp>

Ohio GIS Conference, Columbus, OH, September 16 to September 18, 2009.
<http://ogrip.oit.ohio.gov/Events/OhioGISConference.aspx>

2009 American Society of Landscape Architects Annual Meeting, Chicago, IL, September 18 to September 21, 2009.
<http://www.asla.org/2009meeting/>

10th Anniversary and Annual Workshop of the Michigan Prescribed Fire Council, Roscommon, MI, September 24 to September 26, 2009. <http://mifirecouncil.org/>

Lake Michigan State of the Lake and Great Lakes Beach Association 2009 Joint Conference, Milwaukee, WI, September 29 to October 1, 2009.
<http://www.aqua.wisc.edu/solm/>

7th Annual Wisconsin Association of Floodplain, Stormwater, and Coastal Management Conference, Superior, WI, October 7 to October 9, 2009.
http://wi.floods.org/index_files/Conference.htm

Landscape Architecture: Adjusting to Michigan's Transitioning Economy - Michigan ASLA Annual Conference, Dearborn, MI, October 15, 2009.
<http://www.michiganasla.org/chapter/index.html>

Great Lakes Bioneers Conference Traverse City, Northwestern Michigan College, Traverse City, MI, October 16 to October 18, 2009. <http://www.globconference.org>

Great Lakes Bioneers Conference Detroit,
Detroit, MI, October 16 to October 18, 2009.
<http://www.glbd.org/>

Wild Ones, Annual Meeting and Natural
Landscaping with Native Plants Conference,
Milwaukee, WI, October 17, 2009.
<http://www.for-wild.org/events.html>

Strategies for Sustainability: Providing the
Tools to Go Green - Indiana Chapter ASLA
Annual Meeting and Awards Presentation.
Indianapolis, IN, October 23, 2009.
<http://inasla.org/home>

Great Lakes Bioneers Conference Cleveland,
Cleveland, OH, November 5 to November 7,
2009. <http://www.gcbl.org/bioneers>

Native Plant Communities - What to Plant,
Where, and Why - 16th Annual Conference of
the Indiana Native Plants and Wildflower
Society, Indianapolis, IN, November 7, 2009.
[http://www.inpaws.org/Calendar%20of%20E
vents.html](http://www.inpaws.org/Calendar%20of%20Events.html)

Mercury Science and Policy Conference with
a Special Focus on the Great Lakes &
Northeast Regions, Chicago, IL, November
17 to November 18, 2009.
[http://www.newmoa.org/prevention/mercury/
conferences/sciandpolicy/](http://www.newmoa.org/prevention/mercury/conferences/sciandpolicy/)

70th Midwest Fish & Wildlife Conference,
Springfield, IL, December 6 to December 9,
2009. <http://www.dnr.state.il.us/midwest/>

Entomological Society of America's 57th
Annual Meeting, Indianapolis, IN, December
13 to December 17, 2009,
<http://www.entsoc.org/am/fm/2009/index.htm>

*Cara Hardesty,
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