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The work being conducted in the Calumet region can help other efforts to preserve urban natural environments that suffer from degradation, contamination, and fragmentation, as explained by Nicole Kamins and Laurel Ross.

The Calumet Initiative

Nicole Kamins, Chicago Department of Environment
Laurel Ross, The Field Museum

Abstract

The Calumet region provides a unique opportunity to rehabilitate wetland ecosystems in an urban environment. Researchers throughout the area are working to overcome the many challenges inherent in preserving healthy habitats for use by humans, plants, and animals. This work can inform similar efforts to preserve urban natural environments that suffer from degradation, contamination, and fragmentation not only in the Chicago Wilderness region, but around the world. This article will review the region's history, current efforts to restore its ecology and revitalize its economy, and will highlight several key research initiatives focusing on the Calumet area in the City of Chicago.

History of the Calumet Region: Nature and Development

The Calumet region of Southeast Chicago has a rich and varied history. The Potawatomi Indians inhabited the region prior to industrialization. Industrialization began with the opening of the Calumet and Chicago Dock Company in the late 1800s (Sellers 1998). The establishment of various industries followed, most notably Chicago's steel mills. The first mill opened in 1875, and other mills were opened at key locations along the Calumet River. Railroads were swiftly established throughout the area, solidifying the Calumet area as a regional industrial hub. Immigrant workers and their families of all ethnicities and religions descended on the region to form its labor base. In the 1930s the region's labor movement, through a series of strikes and upheavals, successfully established the United Steelworkers of America (Sellers 1998).

From an ecological perspective, the retreat of the Wisconsin glacier thousands of years ago left behind a series of small lakes. The Calumet River meandered across the area, and wetlands and prairies blanketed the region. Due to variations in fire frequency, soil, and moisture, a wide variety of niches sustained a diverse array of plants and animals (The Field Museum 2002).

The area was famous for its birding, hunting, and natural resources. American soldiers stationed at Fort Dearborn hunted through marshes for game. "They would arrive on the shores of Lake Calumet on fall mornings and find the lake covered with water birds 'of every kind that breed upon this continent.' With the first gun shots, the birds arose in such abundance that they blotted out the sun as they circled in the

air” (The Field Museum 2002). In preparation for the World’s Fair in 1891, renowned landscape architect Frederick Law Olmstead “...dispatched an army of collectors to the shores of Lake Calumet, where they collected twenty-seven train-car loads of iris, sedge, bulrush, and other semiaquatic plants and grasses” (Larson 2003).

With industrialization came large-scale alterations to the landscape, especially its hydrology. The river was channelized and its flow was altered. Railroad companies filled in wetlands to make way for railcars, farmers drained wetlands to make fertile ground for agriculture, and neighborhoods were built upon former marshland. At that time, wetlands were perceived as wasted land, an impediment to development. Various fill materials were sought to create “usable” land. In particular, steel industry waste called slag was used as a fill material. Today, extensive portions of the region contain slag areas more than 7 feet deep, posing a tremendous challenge to restoration initiatives. Dredge spoils from the Calumet River were also deposited in wetlands. In a short period of time, the majority of the region’s wetlands and open spaces were lost.

Beginning in the 1980s, the steel industry slowly began to abandon the Calumet area in favor of other industrial locations. The closure of Wisconsin Steel, Republic Steel, and most recently, Acme Steel in 2001 signaled the end of an era. Over the last several decades, thousands of jobs were lost, a powerful blow to the region’s economy.

Current Efforts

Today, the patchwork of land uses in Calumet reflects the history of the region. Former steel mills and industrial parcels lie alongside remnant open spaces, the majority of which are wetlands. Landfills sit amidst working-class neighborhoods. Evidence of the region’s history can be seen everywhere.

This heavily degraded environment provides incredible opportunities for environmental education, rehabilitation of open spaces, and long-term preservation of critical wetland habitat. According to the National Wetlands Inventory, less than 9% of Illinois wetlands remain. The remaining wetlands in the Calumet area are among the most ecologically significant in Illinois, and provide critical habitat to populations of state-endangered and threatened species. Eleven of the Calumet area sites are listed in the *Illinois Natural Areas Inventory* (1978). In 1980, the U.S. Army Corps of Engineers designated certain Calumet wetlands as highest priority in its *Special Areas Management Program*. The National Park Service listed most Calumet wetlands as important natural resources in its 1998 *Calumet Ecological Park Feasibility Study*.

The open spaces in the Calumet region of Chicago total roughly 4,800 acres, consisting of a range of fragmented parcels, some still hydrologically connected to one another. The largest parcel exceeds 280 acres, a sizable parcel in an urban landscape.

Nature is holding on to what it can. State-endangered plants like Elk Sedge (*Carex garberi*) and Golden Sedge (*Carex aurea*) still make their way through the slag each spring at Van Vlissingen Prairie. In 2002, scientists participating in the Biodiversity Blitz at Wolf Lake, Powderhorn Marsh, and Eggers Woods found 2,257 species in a

24-hour count, a staggering number for a region perceived as degraded and urban.¹



Figure 1: The state-endangered Black-crowned Night-Heron

The number of nesting and migratory birds that still utilize the area's wetlands is impressive. In October 2004, the National Audubon Society and U.S. Fish and Wildlife Service designated the Calumet region one of 48 Important Bird Areas in Illinois. An array of state-endangered and state-threatened birds continue to call the region home, including the Black-crowned Night-Heron (*Nycticorax nycticorax*), Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*), Least Bittern (*Ixobrychus exilis*), and Pied-billed Grebe (*Podilymbus podiceps*). Birders are a common sight on early spring and fall mornings.

Calumet area residents have fought long and hard to preserve the remaining open spaces. They have resisted efforts to develop open spaces, including a proposal by the City of Chicago that would have converted the Calumet area in its entirety into a second airport in the late 1980s.

The City of Chicago became involved in ecological preservation and improvements in earnest in 1997, and in June 2000 Chicago Mayor Richard M. Daley and former Illinois Governor George H. Ryan announced a significant new partnership for the Calumet area called the Calumet Initiative. The initiative is a collaborative effort to rehabilitate con-

currently both the region's open space parcels and its economy over a 20-square mile area, with the goal of demonstrating that ecological and economic restoration can occur in a complementary process. This effort could serve a model for other urban areas around the world suffering from post-industrial challenges.²

1 Sponsored by the City of Chicago Department of Environment, Field Museum, Illinois Department of Natural Resources, Illinois Natural History Survey, Chicago Park District, and Forest Preserve District of Cook County.

2 While this article deals with the ecological portion of the work, Chicago Department of Planning and Development is working toward attracting new, greener businesses to the region to boost its economy.

For the open space portion of the project, a large number of parties are involved, including the City of Chicago, State of Illinois, Chicago Park District, Forest Preserve District of Cook County, as well as 17 additional federal, state and local government agencies, residents and community groups, conservation organizations, local museums, cultural institutions and industrial groups.

To ensure preservation of the remaining open spaces, the Chicago Department of Planning and Development developed the *Calumet Area Land Use Plan*, which recommends 3,000 acres of land for industrial redevelopment and designates 4,800 acres for open space. The open space will be set aside and managed by various state and local agencies (including Illinois Department of Natural Resources, Chicago Park District and Forest Preserve District of Cook County) as the Calumet Open Space Reserve. To date, the City has acquired roughly 450 acres.

Chicago Department of Environment's *Calumet Area Ecological Management Strategy* (2002) includes a framework of goals and approaches for protecting and rehabilitating land within the Calumet Open Space Reserve. It focuses specifically on the ecological health of the region's diverse natural areas—mostly wetlands. Its regional approach to ecological management allows properties to be managed as a collective unit rather than as disparate fragmented parcels. The strategy prioritizes preserving existing plant and animal habitats with high biological value, improving existing habitats that will maximize the potential for native diversity and ecological health, and creating new habitats, where feasible, that will meet the full range of needs for individual native species and communities. The writers acknowledge that restoration in its traditional sense is not the goal for these sites; instead, the term "rehabilitation" is used. Rehabilitation implies that while we cannot go back to pre-settlement conditions, valuable habitat improvements can be accomplished.

Project Highlights

Ford Calumet Environmental Center

The main hub for ecological activity in the region will be the Ford Calumet Environmental Center at Hegewisch Marsh. The City of Chicago Department of Environment, State of Illinois, Ford Motor Company, and Chicago's Environmental Fund have partnered to develop this 24,000 square foot LEED™-certified platinum green building. The building will have many functions, including serving as an educational resource for the industrial, cultural, and ecological heritage of the Calumet area as well as an operational base for research activities, environmental remediation, and ecological rehabilitation. It will also serve for a home for the **Calumet Stewardship Initiative**, a multi-partner effort focused on engaging the Calumet region's residents in environmental action.

The Hydrologic Master Plan

The *Calumet Area Ecological Management Strategy* noted hydrology as a priority issue to be addressed in order to rehabilitate the region successfully. In February 2006, the Calumet Hydrologic Master Plan was released. Development of the Plan was spearheaded by Chicago Department of Environment, Illinois State Water Survey and Illinois State Geological Survey, and was conducted by V3 Consultants. Funding for this regional study of Calumet's hydrology was provided by Illinois Department of Natural Resources' (IDNR) C2000 grant program, City of Chicago,

a Supplemental Environmental Project with Chicago Specialties and US Dept of Housing and Urban Development. Data includes watershed boundaries, groundwater and surface water level monitoring and stage-discharge relationships, water control structure analyses, and identification of hydrologic connections between parcels.

Calumet Ecotox Protocol: Protecting Calumet's Plants and Animals

Due to the extensive use and abuse of the Calumet area's ecosystems, it is no surprise that varying degrees of contamination exist on the open spaces. A major challenge has been determining how to convert the open spaces to nature preserves accessible to both humans and flora/fauna while providing protection from contaminant exposure that could cause adverse health effects.

While protocols exist via the Illinois Environmental Protection Agency regarding cleanup standards that are protective of human health, no current standards exist to ensure the safety of the flora and fauna that have historically used the sites or those that will be attracted to the sites after rehabilitation. Any rehabilitation work would need to avoid creating an attractive nuisance.

To fill this void, the Chicago Department of Environment organized federal, state and local agencies, and current and future landowners. Initially funded with seed money from IDNR's Waste Management and Research Center, they collectively produced the Calumet Ecotox Protocol over a period of two years; it will be released to the public in March 2006. This ecotoxicological protocol serves as a guide to cleanup for Calumet area parcels to ensure protection of ecological health, with screening levels for soil, sediment and surface water. Hegewisch Marsh and Van Vliissingen Prairie are the first two properties for which the protocol will guide site plans.

Calumet Research Summit

The complexities and challenges of environmental work in the Calumet area make it somewhat of a researcher's playground. Ornithologists, toxicologists, sociologists, and many other 'ologists' have all come to research the area.

In 2000, more than 100 researchers gathered at Olive-Harvey College in Chicago for the first Calumet Research Summit. The goals were to encourage interdisciplinary thinking, provide a forum to share findings, and define opportunities for collaboration and priority setting. Major projects, such as the Hydrologic Master Plan and Ecotox Protocol, were conceived at this event. The web of research was explored to identify data gaps, synergies and next steps. A follow-up to this summit was held in January 2006.

Implications for Chicago Wilderness

Although much of the work described above is taking place in the portion of Calumet within the City of Chicago, from a Chicago Wilderness perspective the greater Calumet region reaches well beyond City boundaries and includes south suburban municipalities in Illinois, cities and towns in northwest Indiana, and the Indiana Dunes National Lakeshore. This region provides many compelling opportunities and challenges that are of national and international interest as the effort to improve the quality of life for residents while restoring the natural

landscape moves forward. This was amply demonstrated last summer when a delegation of Chicago Wilderness representatives used the Calumet Region as a case study to illustrate the collaborative approach of Chicago Wilderness at the White House Conference on Cooperative Conservation held in St. Louis in late August 2005. This presentation received a great deal of attention because the difficult problems being tackled in Calumet are so similar to those faced in many urban landscapes and innovative solutions that are being crafted can inform other efforts in Chicagoland and elsewhere. To that end, as part of the St. Louis conference, Lynne Westphal, Project Leader and Research Social Scientist for the USDA Forest Service, North Central Research Station, compiled a wealth of Calumet information on a comprehensive CD-ROM.

Closer to home, the 2006 Calumet Research Summit held this past January addressed the broader geography to a significant degree. Panels focused on toxicology, ecology, hydrology, sociology, economics and innovative technologies, and a team emerged from the Summit that is preparing an integrated, multi-disciplinary research agenda for the bi-state Calumet region. This research agenda will identify and prioritize research questions, foster research partnerships, and secure the financial and other resources needed to proceed. Chicago Wilderness can benefit directly from this effort, and particularly the fledgling CW Social Science Team (born in 2005).

Also in 2005, a CW Calumet Task Force came together to develop work plan projects in order to implement aspects of the CW *Biodiversity Recovery Plan*. These projects move beyond study to action. The sizable membership of that Task Force (45 CW partners ranging from large federal agencies to small local NGO's) demonstrates CW's broad interest in Calumet. The region offers us opportunities to learn and to expand our palette of conservation strategies.

For More Information

The USDA Forest Service North Central Research Station, which helps manage the flow of research information, compiled a CD-ROM of Calumet-related research. To obtain the CD-ROM, contact Cherie LeBlanc at cleblanc@fs.fed.us or (847) 866-9311 x 12. For information about how to obtain the proceedings of the Research Summit contact Donna Cicinelli at donna.cicinelli@cityofchicago.org or (312) 744-5917.

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Discover who does and does not have the potential to be receptive to CW messages within the CW region in this article by Andrew Kimmel, Carol Saunders, and Lucy Hutcherson.

Chicago Wilderness Audience Research Project

Andrew Kimmel, Lake County Forest Preserves

Carol Saunders, The Brookfield Zoo

Lucy Hutcherson, Chicago Wilderness

Introduction

Education and communication efforts usually work best when messages are targeted to specific audiences. From 2002 to 2004, a Chicago Wilderness (CW) project team comprised of communicators and social scientists from a number of CW member organizations undertook an Audience Research Project to better understand how to reach potential audiences with messages about the importance of preserving the biodiversity of our region. While research showed broad overall support for environmental issues, only a relatively small group of people currently act on that support. It also identified people who might be encouraged to take action in support of biodiversity protection in the future.

Working with two professional market research firms, The Moran Group and Richard Day Research, Inc., the project team was able to better understand what people think about biodiversity issues. The Moran Group helped CW gather and analyze existing research, and to identify gaps and trends in that information. Richard Day Research completed a regional survey of public attitudes about biodiversity.

Background

The Audience Research Project had several broad goals. Two goals were related to the communication plan previously developed by staff and CW communications professionals for Chicago Wilderness in 2001: Evaluation (target audiences, improve communication strategies, measure success) and Capacity Building (improve members' understanding of audiences). Another goal related to the CW Report Card on the health of local natural areas, which will debut in April, 2006: providing a repeatable survey to measure change in key benchmarks over time.

In addition, during 2003 and 2004, Chicago Wilderness underwent a strategic planning process. Through this process, several groups emerged as high-priority audiences for CW: elected officials and other local decision-makers, developers and land-use planners, suburban residents and open space neighbors, and diverse ethnic groups. The information gathered through the Audience Research Project will help inform future communication efforts targeted at those groups.

“Chicago Wilderness issues are rated somewhat important, but below other issues facing area residents”

Initial Investigation

Secondary analysis of existing research³ by The Moran Group⁴ during the first phases of the project helped identify four major audience groups for the Chicago region based on 1) degree of concern for the environment and 2) their level of involvement with conservation organizations:

CORE Supporters (16% of total population)

These people disagree a little or disagree strongly with the statement, “There is too much concern for the environment” and are members of, volunteers for, or donors to conservation organizations.

Periphery, but OPPORTUNITY (33%)

These people disagree a little or disagree strongly with the above statement, but are not members of, volunteers for, or donors to conservation organizations.

Uninterested (47%)

These people agree a little, or neither agree nor disagree with the statement, and are not members of, volunteers for, or donors to conservation organizations.

Antis (4%)

The people in this group strongly agree with the statement, “There is too much concern for the environment,” and are not members of, volunteers for, or donors to conservation organizations.

Regional Survey

In the next phase of the Audience Research Project, a survey was designed to fill in gaps in what we know about our audiences in the CW region and to provide a benchmark for measuring change in attitudes over time.

Telephone interviews were conducted in September 2004 with 803 residents of the CW region. The survey was conducted by Richard Day Research, Inc.⁵, Evanston, IL. Results were presented at the CW Congress in November 2004.

The survey was designed to assess: general awareness and attitudes toward biodiversity conservation issues; perceived quality of life as it relates to open space; and level of participation/involvement in conservation events and activities.

³ Data are from the Simmons Market Research Bureau survey (Fall 2002).

⁴ The literature review, data analysis and cluster analysis conducted during the first two phases of this project were performed by The Moran Group, 1609 Sherman Avenue, Evanston, IL 60201, in consultation with the Chicago Wilderness project members

⁵ The survey, data analysis and cluster analysis conducted during the third phase of this project were performed by Richard Day Research, Inc., 820 Davis Street, Evanston, IL 60201, in consultation with the Chicago Wilderness project members.

The key findings are:

- Chicago Wilderness issues are rated somewhat important, but below other issues facing area residents. Safety from crime is rated very important. Issues related to air and water quality are rated very important. Most people were satisfied with the quality of life in their immediate community.
- People regularly visit their community parks and forest preserves: 90% of households had visited a neighborhood park or playground during the previous two years, 84% had visited Lake Michigan or another lake, and 78% had visited a forest preserve, state park or conservation area.
- In terms of awareness of biodiversity: 26% of those surveyed had heard about the issue of biodiversity loss and were able to provide a definition, 19% said they have heard of the issue but were unable to define the term, and 55% had not heard of the issue of biodiversity loss. This compares to a national study conducted by Belden Russonello and Stewart: the percentage of survey respondents that had not heard of the loss of biodiversity was 80% in 1996 and 68% in 2002.
- In terms of knowledge levels reported by survey respondents: 49% of respondents said they were somewhat or very knowledgeable about plants and animals that live in this region. Of those, 35% said they were very proud to live here because of the region’s nature, and 55% said they were somewhat proud to live in this region because of its nature.
- In terms of attitudes about open space: 65% of area residents value the idea of having natural areas and open space “a great deal,” and 27% say it matters “somewhat.” Area residents support preserving open space by a substantial margin; 55% of area residents strongly support preserving open space, 11% support it, but not strongly.
- In terms of attitudes about removing invasive species: when asked, “Do you support or oppose volunteers and staff at forest preserves and other conservation areas removing plants and animals that are not native to this area?” 42% supported it, 38% opposed, and 20% were not sure. When those who opposed it were asked the follow-up question, “Would you support removing non-native plants and animals if it improves habitat for native plants and animals?” the numbers changed: 65% of respondents supported it, 11% were still opposed, and 24% were not sure.

Using an approach similar to the segmentation by the Moran Group, respondents were classified into one of four groups, depending on their degree of concern about

	Have Not Acted	Have Acted
Above Average Concern with Chicago Wilderness Issues	16% Opportunity	9% Core
Less Concern with Chicago Wilderness Issues	52% Disengaged	23% Opportunity

Chicago Wilderness issues and whether or not they have acted environmentally (been a member, volunteer or donor to an environmental organization, or volunteered their time to help the environment through clean ups, restoration or recycling).

- The 9% that are concerned about Chicago Wilderness issues and have acted are a committed core group. People in this group tend to be very active outdoors, are frequently Caucasian females between the ages of 44 and 52 with no young children in the household, and often have high incomes.
- The 16% that are concerned about Chicago Wilderness issues and have not acted might be difficult to engage but provide an opportunity to build on their interest. Members of this group tend to be African-American or Hispanic, age 53+, have lower levels of education, have income under \$50K, live in Chicago and Lake County, Illinois, be female and rent their residences.
- The 23% that are not concerned about Chicago Wilderness issues but have acted are potentially another opportunity group. They tend to look like the core committed group (upscale, suburban) but just don't care as much about Chicago Wilderness issues. A few typical characteristics: they are very active outdoors, age 35-43, have some college education, have income over \$50K, and live in McHenry County and suburban Cook County, Illinois.
- The 52% that are not concerned about Chicago Wilderness issues and have not acted would be the most difficult to reach and might be called disengaged. They are typically the people who are the least active outdoors, younger, have income under \$30K, are often African-American, live in urban areas and rent their residences, and are not registered to vote.

Conclusion

Although The Moran Group study and Richard Day Research study used different questions to create the audience segments, together they suggest that approximately 9 – 16% of the people in the Chicago Wilderness area could be considered part of our CORE group (people who are concerned with CW or environmental issues and engaged in conservation behaviors). Roughly 51 – 52% of the people are DISENGAGED (less concern for CW issues and not active). The OPPORTUNITY group(s) are defined differently by the two studies, but it appears that roughly 33 – 39% of the CW residents are either concerned about environmental issues or engaged in conservation behaviors. More research is needed to further understand these people, who have the potential to be receptive to CW messages for different reasons.

In addition, the survey can be further modified and repeated to improve its ability to monitor knowledge, attitudes, and behaviors related to biodiversity and Chicago Wilderness and thereby contribute to future iterations of the CW Report Card. Likely additions include more questions about the way different audiences value the natural world, and new ways to document environmental literacy that have been successfully used in other states. All future research will be guided by the overall research agenda being created by the CW Social Science task force, in support of the CW strategic plan.

CW members who are interested in participating in future audience research efforts should contact Lucy Hutcherson, Chicago Wilderness director of communications, at lhutcherson@chicagowilderness.org or 708-485-0263, x253

In an effort to develop a regional strategy for wetland conservation, a group of Chicago Wilderness members created GIS models to identify areas of critical wetland habitat. Learn more about the criteria that went into these models and how they will inform wetland conservation work within the CW region.

Wetland Conservation Strategy Model Development

Prepared by Northeastern Illinois Planning Commission
Author, Laura Barghusen, is now Associate Greenways
Director at Openlands

Abstract

The goal of this project was to develop Geographic Information Systems models to identify and map critical wetland habitats in the Chicago Wilderness region. It was undertaken to assist in the prioritization of wetlands for a regional protection strategy. Models were designed to highlight quality habitat for non-game species of concern such as threatened and endangered wetland birds, reptiles and amphibians and to highlight areas with high wetland restoration potential. The models were supplemented by the creation of maps showing general locations of heritage wetland communities from the Natural Heritage Databases of Illinois, Indiana and Wisconsin and priority lakes, streams and rivers identified in *The Chicago Wilderness Biodiversity Recovery Plan*. This project addressed the need for a consistent method of prioritizing wetland resources for protection and restoration across the region.

Introduction

In 2000, the Wetlands Initiative and the Chicago Wilderness Wetlands Task Force created a Geographic Information Systems (GIS) model to identify important basin marsh resources in Northeast Illinois and Northwest Indiana with an emphasis on highlighting wetland bird habitat. Northeastern Illinois Planning Commission (NIPC) then worked with the Wetlands Task Force to refine the model inputs and extend the basin marsh model into the Wisconsin counties of Kenosha, Racine and Walworth. NIPC also worked with the Wetlands Task Force and several reptile and amphibian experts to develop additional models to identify wetland areas important to reptiles and amphibians and to highlight areas with a high potential for wetland restoration. This effort was completed in 2005.

This project used existing GIS data to do an unprecedented region-wide assessment of wetlands. Although countywide assessments of wetlands (completed under the U.S. Environmental Protection Agency's Advanced Identification of Aquatic Resources (ADID) program) exist for some parts of the region, namely Kane, McHenry and Lake Counties in

Illinois and the northern portions of Lake, Porter and LaPorte Counties in Indiana, a region-wide assessment of wetlands had not previously been done. A consistent method applied to the entire region was needed in order to prioritize wetlands for conservation. Important wetland resources may cross county and state lines, such as the Wolf Lake area on the Illinois/Indiana border. A region-wide model allows these areas to be assessed using the same methods.

To complement the models, maps were created to display the general location of heritage wetland communities, and priority lakes, streams, and rivers, as identified in the *Chicago Wilderness Biodiversity Recovery Plan*. In addition, a map showing projected change in population density between 2000 and 2030 by subwatershed was developed in order to identify areas projected to undergo rapid growth over the next thirty years.

The modeling and mapping efforts accounted for much of what is currently considered the “Chicago Wilderness Region.” This included Cook, DuPage, Kane, Lake, McHenry and Will Counties in Illinois; Lake, Porter and LaPorte Counties in Indiana; and Racine, Kenosha and Walworth Counties in Wisconsin.

The models and maps created were designed to provide information to support the writing of a Chicago Wilderness Wetland Conservation Strategy Report, which will discuss protection strategies based on priority areas identified by the modeling process.

Methods

Creating the Models

This modeling effort relied heavily on wetland data from the National Wetlands Inventory (NWI) dataset and the Wisconsin Wetlands Inventory dataset to create inputs for the models. NWI mapping was not done in the state of Wisconsin. The NWI is based on interpretations of aerial photographs of the Chicago region, which were primarily taken in the early 1980s. Many of these wetlands may no longer exist, and the lack of current region-wide GIS data on wetland location to use as an input is a limitation of this modeling effort. However, comparison of high-scoring areas from the basin marsh model in Kane County to wetlands that received high scores for habitat value based on 2002 aerial photography screening done for the Kane County ADID study indicated good agreement between them. Other important datasets used as model inputs included current state land cover datasets and Natural Resource Conservation Service soils datasets.

Inputs to the reptile and amphibian models and the basin marsh model are designed to emphasize wetlands that are surrounded by other wetland areas, forming “wetland complexes” thought to be important for the long-term survival of species. They also emphasize wetlands surrounded by non-wetland land cover types that are known to be important habitat for wetland bird and reptile and amphibian species.

The restorable wetland model identifies areas of hydric soil that occur outside of areas currently considered wetland. Areas that had wetland hydrology in the past (indicated by the presence of hydric soils) may have potential to begin functioning as wetlands again if restoration work is done. Hydric soils in agricultural and vacant land use types are emphasized because these are generally more conducive to wetland restoration than such land uses as residential, commercial, and industrial.

The models were created by generating a GIS layer that imposes a grid on the Chicago Wilderness region. Each cell in the grid represents an area of 30 meters by 30 meters (0.09 hectares) on the ground. Each grid cell then had a score assigned to it based on the sum of the values of model inputs that corresponded to the location of that cell. Cells with high scores represent important wetland habitat. Inputs to the basin marsh model and the reptile and amphibian models are similar but input scores are defined somewhat differently to emphasize habitat characteristics that are important to the particular taxa in question. The following four inputs were used to create the reptile and amphibian wetland associate model, shown in Figure 1. Inputs to the other models are not described here, but a full description of each model is available in the final report for the project.

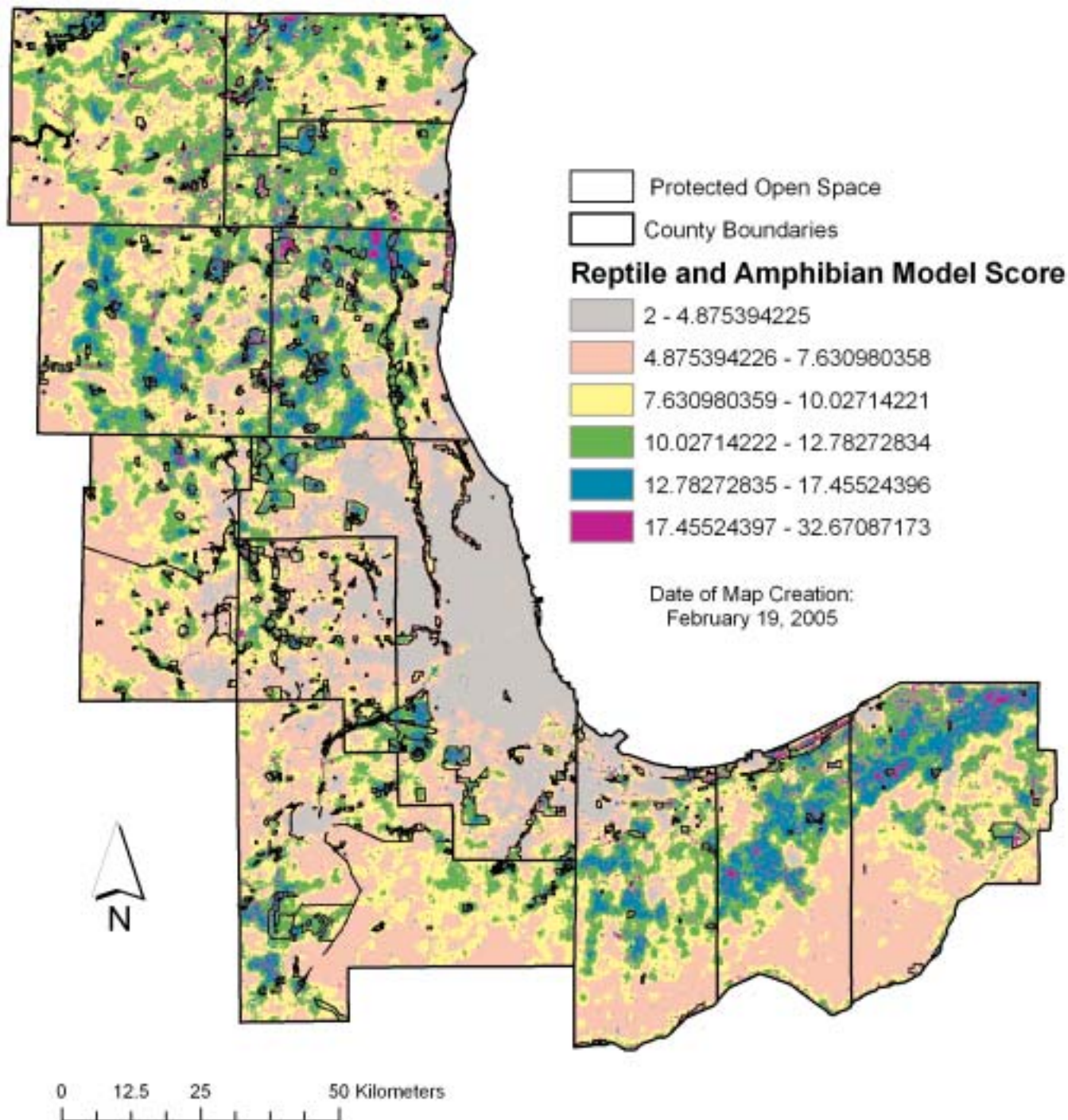
1. *Wetlands Inventory Class*: Grid cells corresponding to locations of wetland types known to be important habitat for reptiles and amphibians. For example, palustrine (marshy) forested wetlands, palustrine scrub/shrub wetlands, palustrine emergent wetlands and palustrine aquatic bed wetlands received high scores. Grid cells corresponding to other wetland types such as riverine (associated with rivers) and lacustrine (associated with lakes) wetlands and non-wetland areas received lower scores.
2. *Wetland Diversity*: Grid cells corresponding to areas surrounded by many different wetland types within 1000 meters received high scores. Grid cells corresponding to areas surrounded by a lesser diversity of wetland types received lower scores. The distance of 1000 meters was chosen as an approximate home range for reptiles and amphibians.
3. *Number of Basins*: Grid cells corresponding to areas surrounded by a great number of wetlands within 1000 meters received high scores. Grid cells surrounded by a fewer number of wetlands received lower scores.
4. *Land Cover Type*: Grid cells corresponding to wetlands surrounded by non-wetland landcover that serves as good reptile and amphibian habitat received high scores. Grid cells surrounded by less desirable non-wetland landcover received lower scores.

Creating the Maps

In order to supplement the models, mapping of known high-quality wetland and aquatic communities was undertaken, along with mapping of areas likely to undergo intense development pressure over the next 30 years.

The *Chicago Wilderness Biodiversity Recovery Plan* defines the status, needs, and goals for terrestrial communities, including wetlands. Wetland community types are prioritized in the *Biodiversity Recovery Plan* for conservation and placed in one of the following three tiers: 1) highest—graminoid fen and panne; 2) basin marsh, calcareous floating mat, calcareous seep and streamside marsh; and 3) forested fen and sedge meadow. Some community types that the Wetland Task Force decided to include as wetland types for the purposes of the Wetland Conservation Strategy Model Development were not described as wetlands in *The Biodiversity Recovery Plan* but were instead described as forested communities and prairie communities. These include communities such as wet prairie, floodplain forest, and northern wet forest (flatwoods). These community types were mapped for this project according to the

Chicago Wilderness Reptile and Amphibian Wetland Associate Model



tier to which they were assigned in *The Biodiversity Recovery Plan*. For example, northern wet forest (flatwoods) is assigned to the second tier within the forested community restoration target scheme so it was mapped as a second tier priority on the wetland community type map created for this project.

For this project, generalized locations of wetland community types from the Natural Heritage Databases of Illinois, Wisconsin and Indiana were mapped according to their *Biodiversity Recovery Plan* tier. In order to protect the sites from exploitation, the specific location and the particular community type (such as bog, etc) do not appear on the maps. Community types not tiered by Chicago Wilderness were mapped as “Not Tiered.” Generalized locations of fens from the Kane County ADID were also mapped according to the tiered priority method used in the *Chicago Wilderness Biodiversity Recovery Plan*.

Aquatic community status, needs, and goals from *The Biodiversity Recovery Plan* were also mapped for this project. Streams are mapped according to the goal defined for them in Chapter 6. These goals are: 1) protection—very high priority; 2) restoration—high priority; 3) rehabilitation; and 4) enhancement. Lake communities from *The Biodiversity Recovery Plan* were also mapped if characterized as “exceptional” or “important.”

Projected population change between 2000 and 2030 by subwatershed was mapped using data from the 2000 census and from NIPC’s 2030 population forecast by quarter section. This map covers only the counties incorporated in NIPC’s population forecast including Cook, DuPage, Kane, McHenry, Will, and Lake Counties, Illinois.

Results and Discussion

This project was undertaken to provide information to facilitate the preparation of a regional wetland conservation strategy for Chicago Wilderness. The models and maps created for the project will help give a clearer picture of the location and quality of wetland resources.

The basin marsh model and the reptile and amphibian model are similar in that they both confer high scores to areas with the following characteristics: 1) a large number of wetlands occurring within a radius representing the size of the area that wetland birds or reptiles and amphibians might reasonably be expected to use; and 2) close proximity to non-wetland land cover serving as good habitat for wetland birds or reptiles and amphibians. The reptile and amphibian models and the basin marsh model tend to highlight similar areas. The models do differ in some ways, however. For example, palustrine forested and palustrine scrub/shrub wetland types receive the highest possible scores in the reptile and amphibian models but receive lower scores in the basin marsh model because these wetland types do not provide as much habitat value for wetland bird species. Using the basin marsh model and the reptile and amphibian model together when prioritizing wetlands for protection will help ensure that habitat important to a range of species of concern are considered.

Using the map of heritage wetland communities in conjunction with the models can increase the likelihood that high-quality wetland areas will be recognized. For example, wetland communities in more urbanized areas that provide important habitat for threatened and endangered wetland birds or reptiles and amphibians may not score particularly high in either the basin marsh model or the reptile and amphibian model because urbanized landcover yields a low score in these models. The Calumet area is a good example of an area that does not score as high as would be expected in the basin marsh model given the number of threatened and endangered wetland bird species the area supports. Thus heritage wetland community maps should be used in conjunction with the models when prioritizing wetlands for protection and restoration.

Comparing projected change in population density between 2000 and 2030 to areas that score high in the models highlights rapidly growing areas where important wetland resources may soon be lost. Some of these areas include the Ferson-Otter Creek, Bowes Creek, Stony Creek, Eakin Creek, Tyler Creek and South Branch Kishwaukee River watersheds in Kane and McHenry Counties. Using this population change map in conjunction with the other maps and models created for this project will also aid in prioritization of wetlands for protection.

In order to assess the accuracy of the reptile and amphibian wetland associate model, Mike Redmer of the U.S. Fish and Wildlife Service examined the model to assess how well it captures high quality reptile and amphibian habitat in the Forest Preserve holdings of DuPage County. Mike has conducted extensive reptile and amphibian surveys in Northeastern Illinois. He found that the model appears to accurately capture general areas with high wetland reptile and amphibian diversity. However, the very highest model scores did not, as a general rule, represent habitat that was higher quality for reptiles and amphibians than the habitat represented by the second and third highest scoring model categories. Therefore, when prioritizing areas for conservation, caution should be used when interpreting the very highest scoring areas in the model with the knowledge that slightly lower scoring areas may indicate habitat of equal or higher quality.

The maps, models, and final report produced for this project can be accessed by contacting Mike Hoather, GIS Analyst at Northeastern Illinois Planning Commission (mhoather@nipc.org).

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Approximately 90 percent of the landscape is subject to the planning and development decisions of local governments.

Deanna Glosser explores how to reach local governments and help officials make biodiversity-friendly decisions.

The Sustainable Watershed Action Team (SWAT)—Providing Technical Assistance to Local Governments

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Abstract

The tremendous growth pressures in northeastern Illinois are resulting in the loss of significant natural resources. Local officials have identified a need for assistance to help them address the sprawling development that is occurring—to provide them with hands-on technical assistance to improve their planning infrastructure and incorporate sustainable development practices. Chicago Wilderness funded the Sustainable Watershed Action Team (SWAT) composed of experts in conservation design, stormwater management, and use of native vegetation to work directly with local officials and/or developers on specific planning or development projects. One of the lessons learned after almost two years of SWAT's efforts is that local officials are key to the success of a project. Local officials have the authority to develop state-of-the-art comprehensive plans, pass sustainability-based ordinances, and approve sustainable developments. Continuing a direct, hands-on outreach effort is important in addressing the population growth and loss of natural resources that is projected for the future.

Background

According to the Northeastern Illinois Planning Commission (NIPC), the population of the Chicago region will increase from its current 8 million residents to 10 million by 2030 (NIPC 2005). This increase in population will result in the loss of an additional 337,000 acres of land to accommodate the housing, roads, and other supporting infrastructure. NIPC's *2040 Regional Framework Plan* identifies the need for the region to proactively minimize the consumption of land and protect important open space and natural resources in accommodating this growth.

Chicago Wilderness (CW) shares these goals. In their *Biodiversity Recovery Plan*, key goals identified include protecting globally and regionally important natural communities and developing citizen understanding of biodiversity to garner their support and participation.

Protecting the region's natural resources, however, is going to be a challenge. Approximately 90 percent of the landscape is subject to the planning and development decisions of local governments. If development practices are not altered, not only will these privately held lands be destroyed or degraded, but publicly held lands will also suffer. The question is how are these local development practices going to be changed?

To explore this question, one of the work groups established by CW addressed the needs of local units of government. A local needs assessment was funded that identified a series of mechanisms for effectively conveying CW's message to local officials. The most effective and necessary mechanism identified was the ability to communicate directly with elected officials, staff, and local residents. Local officials identified a need for hands-on technical assistance, which contributed to the development of an innovative and exciting technical assistance outreach effort—the Sustainable Watershed Action Team.

The Sustainable Watershed Action Team (SWAT)

The Sustainable Watershed Action Team (SWAT) project, funded by CW, is designed to meet the technical assistance needs identified by local officials in northeastern Illinois. SWAT focuses its efforts where there is an abundance of sensitive natural resources such as wetlands, forests, or high quality streams. SWAT utilizes a unique approach and has been successful—and in some cases unsuccessful—since it began in March 2004. These projects, lessons learned, and recommendations for the future will be presented below.

SWAT is a team of private consultants with direct experience in successfully designing and implementing or preparing comprehensive plans for developments utilizing conservation design practices. The involvement of experts with hands-on experience is key to SWAT's approach to providing technical assistance and distinguishes it from other outreach efforts. The credibility of the message is increased dramatically when the experts have been successful, both ecologically and financially, in creating and implementing conservation design plans or developments.

The issues addressed by SWAT typically include innovative stormwater management, use of native vegetation, conservation design strategies, and the long-term protection of a site's sensitive natural resources. Experts in the following disciplines have been included in SWAT projects: engineering, hydrology, landscape architecture, environmental planning, and ecology.

Various models of service delivery have been utilized to determine which are most successful in affecting change. These models include projects where:

- Local officials are fully supportive and involved;
- The developer is involved but not the local officials, and
- Citizen groups and/or state or federal agencies are involved but neither the local officials nor the developer were engaged.

Different types of services have also been provided, based on the need of the project. These include:

Providing Direct Assistance to the Development Community

A service provided to the development community involves the review of specific development plans to provide suggestions as to how the preliminary plat could be

revised to be more protective of natural resources or how conservation design practices could have been incorporated at the beginning of the design process. It is hoped that this review process will influence future developments.

Following this approach SWAT reviewed preliminary plans for two developments, one in Will and one in Kane County. The project in Kane County was controversial, and the local officials chose not to participate. The developer recognized the value of SWAT's expertise but did not want the results to be made public or shared with the municipality to avoid elevating the controversy or forcing changes to their design. SWAT conducted a "closed" review, which proved to be largely ineffective. While SWAT provided invaluable suggestions to the developer as to how to best protect the natural resources on the site, without the information being shared with at least the municipality, little changed before the development moved forward. Efforts were also made to work with the attorney of several large developers to engage them in dialogue about conservation design practices.

Technical Assistance to Local Governments

Many local units of government do not have the resources to research and evaluate best practices to be adopted to improve development within their communities. In other cases, local governments face time pressures in meeting deadlines or are not familiar with natural resource issues. SWAT has assisted communities in preparing annexation agreement language and comprehensive plans. In each of these cases, the local officials welcomed SWAT to participate in their planning effort.

In one case, the community had developed an innovative and exciting vision plan for a portion of the city. For the plan to be realized, however, annexation agreement language was needed more quickly than the city could provide. SWAT was engaged and quickly provided language that would ensure the realization of the community's vision. In another SWAT effort, a small community at the developing fringe was beginning their comprehensive plan. The community had limited resources but significant natural resources. SWAT developed a comprehensive document that addressed water quality and quantity, conservation design standards, use of native vegetation, and the protection of natural resources in perpetuity. From this document, specific objectives were written for inclusion in the comprehensive plan. The final plan and supporting document from SWAT were approved by the village board. SWAT was involved in this project for just over one year.

SWAT also participated in the development of a watershed plan with a coalition of local governments and not-for-profit organizations. In this case, SWAT provided a consultant to conduct water quality testing, and field assessments to document site conditions, and to pose recommendations as to how to best address problems of sedimentation, stream bank erosion, and the presence of water pollutants. The consultants also examined the potential to re-meander sections of the stream to restore natural conditions. This type of service is important—and not usually available from other sources. Funding was available for portions of the watershed plan but not for the collection of the scientific data needed to develop an effective watershed plan.

Participating in a Community with Charrettes or Workshops

SWAT conducted a community charrette with the objective being to develop one or more conceptual development designs for consideration by the developer and local officials. A charrette is a creative process akin to visual brainstorming that is used to

develop solutions to a design problem within a limited timeframe. Because the project was locally controversial, the developer and the local officials did not participate in the charrette. The final SWAT product was a preliminary plan that protected the most significant natural resources while retaining the financial viability and marketability of the site. Unfortunately, as a result of the lack of involvement by key players, this plan did not move forward. The community charrette concept is exciting, and under the right circumstances, could prove extremely useful in promoting sustainable development practices.

SWAT consultants prepared a comprehensive presentation on conservation design practices for a small community at the developing fringe. This workshop was the first in a series of three designed to assist in the review of the village's comprehensive plan and existing ordinances. This presentation was open to the village board, planning commission, and the public. SWAT discussed the need to consider existing natural resources and the natural functions of the land when designing a development. There was tremendous support for conservation design principles, and the village is now working to update its ordinances to allow and even encourage these practices to be used in the community. A similar workshop is also being developed for another neighboring community with a similar abundance of natural resources. Interest was expressed at the first workshop to provide a similar presentation to all communities located at the urban fringe.

Linking Conservation Design Consultants with Developers and/or Landowners

On numerous occasions, SWAT was invited to participate in projects that were too large or complex for its funding grant. In these cases, the landowners or developers were given the names of conservation design experts. This service could be greatly expanded in order to link those interested in adopting conservation design with the experts in this field.

Providing technical information to assist the review of proposed development plans

A service not anticipated at the beginning of SWAT is the development of technical information to assist local officials in the review of proposed development plans. One community had a proposed development with onsite wetlands. Their preliminary plat did not clearly delineate the location of these wetlands, and the local official did not have an understanding of the various wetland regulatory programs that would likely affect the design of the project. SWAT developed a list of questions to ask the developer that should lead to greater protection of those wetlands. This service could easily be expanded to other topics, such as stormwater management and protection of riparian corridors.

Time was spent examining an additional eight to 10 projects as potential undertakings for SWAT. This is another aspect of SWAT that was time-consuming. A number of local governments or private landowners were interested in utilizing the services of SWAT; however, many did not meet the grant restrictions. In some cases, the projects were too large in size or scope; in others, there were insufficient natural resources to warrant the involvement of SWAT.

Lessons Learned

SWAT projects conducted over the last two years have led to six key lessons learned:

- Technical assistance efforts must be hands-on and customized for a specific community or project to be successful. While brochures are helpful in attracting the interest of local officials, most communities SWAT dealt with did not find them to be specific enough or targeted to meet their needs. They expressed support for the direct, hands-on approach offered by SWAT.
- The messenger has to be credible (e.g. engineer to engineer, expert to local officials). Integral to SWAT's success is dialogue between people with direct experience in designing and implementing marketable, profitable, and environmentally sensitive projects and local officials, community engineers, and developers. Simply having knowledge of the subject is not sufficient to persuade communities, developers, and their bankers to change their design strategies.
- Focusing on the planning infrastructure is more fruitful than reviewing preliminary plats. At the beginning of the project, SWAT intended to work on specific proposed projects to make them more sustainable. This approach is successful only if communities have the planning infrastructure in place to allow these developments to be approved in a timely manner. The first step, therefore, is to work with communities to update or prepare environmentally sound comprehensive plans and supporting ordinances.
- Working with developers **before** any design work has even been considered is crucial. By the time a preliminary plat is prepared, the developer has a substantial financial investment in the project. Working with developers and communities as a site is designed allows greater opportunities for success in incorporating conservation design practices.
- Cooperation of the municipality is the key to success. This is the most important lesson learned. Local officials develop comprehensive plans, pass ordinances, and have the authority to approve developments within their community. If local officials are not supportive of SWAT's involvement, it will be virtually impossible to implement conservation design practices and protect natural resources successfully.
- There is a tremendous need for planning and design services that the current SWAT effort cannot provide because SWAT focuses on natural resources. Local governments have a tremendous need for assistance in updating plans and ordinances, and education on conservation design practices, transit-oriented development, affordable housing, and more. Because of this great demand, much time was spent in evaluating projects for acceptance by SWAT.

Looking to the Future

In order to be successful in altering the development practices in the rapidly growing northeastern part of the state, it is critical to continue with a hands-on technical assistance outreach effort, preferably a SWAT-like approach using experts to carry the message and assist in developing plans and reviewing or designing plans. The biggest challenge is finding the resources to deliver this technical assistance, which is labor intensive and therefore expensive.

It is possible that a much more comprehensive approach is needed. One innovative and exciting method of providing technical assistance to local governments and developers on a wider range of topics, while using SWAT and other state-of-the-art tools, would be to establish a “Sustainable Communities Institute”, modeled, in part, after the Sonoran Institute in Tucson, Arizona. This Institute could be established with a coordinator, and funding to hire the appropriate experts on a case-by-case basis to address a specific problem or project. An Institute could begin by addressing natural resource issues but expand to deal with other quality of life issues such as transportation, housing, and sustainable economic development.

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Interpreters are storytellers and entertainers who attempt to make a personal connection from tangible objects and resources to intangible ideas. Learn what interpretation is and why it is such an important component in accomplishing consortium goals in this article by John Elliott.

Interpretive Training for Chicago Wilderness

John Elliott

Forest Preserve District of Cook County

Abstract

A “Train the Trainers” workshop, organized by the Chicago Wilderness (CW) Interpreter’s task force and conducted by the National Association for Interpretation (NAI), was held at the Morton Arboretum in January, 2005. Attended by 24 representatives of CW organizations, the purpose of the five day workshop was to certify experienced interpreters and supervisors to conduct training in interpretive techniques for their organizations. Since 2002, the task force has hosted a variety of training and roundtable events for interpreters; this 2005 workshop was a step forward in increasing professionalism through formal training and certification with NAI. The Forest Preserve District of Cook County (FPDCC) conducted the first certification workshop for interpreters doing public programs under the NAI program in July, 2005. Staff training by other CW organizations has been conducted or is planned. Improving and enhancing interpretive services within Chicago Wilderness directly addresses several goals of the Biodiversity Recovery Plan.

Interpretation – what is it?

“So you’re an interpreter—what languages do you speak?” Everyone who has been introduced as an “interpreter” has heard this question. We may explain by adding specifics, such as, “I’m an interpretive naturalist” or “I’m a historical interpreter,” answers that still do not have much meaning for most people.

Interpretation as it applies to biodiversity and Chicago Wilderness might be viewed as sleuth education. Our goal is to deliver a thematic message that will provoke a positive response, but unlike formal environmental educators we usually do not have an ongoing curriculum or an audience that is required to stay with us. We are storytellers and entertainers who attempt to make a personal connection from tangible objects and resources to intangible ideas. We hope that those connections lead to understanding, valuing, and caring for biodiversity.

Many interpreters have become successful through their natural abilities, hard work, and experience, but touching an audience in a meaningful way is a difficult challenge; therein lies the value of interpretive training, as facilitated and

The Interpretive Equation:

$$(Kr + Ka) \times AT = IO$$

*Knowledge of the Resource +
Knowledge of the Audience x
Appropriate Techniques =
Interpretive Opportunities*

conducted by the Interpreters task force of the CW Education Team. Since its inception in 2001, the task force has facilitated interpretive training, with the first formal training session occurring in February, 2002.

Background

“I will interpret the rocks,” said John Muir, “... and get as near to the heart of the world as I can.” (Browning 1988) That was probably the first use of the word interpret in this sense. Through efforts of people like Muir, and growing along with the conservation movement through the first half of the 20th century, “nature study” was the precursor of both environmental education and professional interpretation. Freeman Tilden’s *Interpreting Our Heritage* provided the first organized, professional approach to interpretation. Tilden proposed six principles of interpretation that remain the foundation of the profession (Tilden 1957). Paraphrased, they are:

- Interpretation relates what is being described to the personality or experience of the visitor;
- Interpretation is not information, it is revelation based on information;
- Interpretation is an art;
- The chief aim of interpretation is not instruction, but provocation;
- Interpretation presents wholes, not parts, and is addressed to the whole person; and
- Interpretation for children is not a dilution of the presentation for adults, but is fundamentally different.

About this time, naturalists from several future CW member organizations joined with colleagues at Bradford Woods, Indiana, to share ideas about interpretation as a profession. From this initiative the Association of Interpretive Naturalists (AIN) was born. In 1988, AIN merged with the Western Interpreters Association to form the National Association for Interpretation (NAI). Both NAI and CW interpretive training are based on Tilden’s principles.

Professional Training and Certification

An important part of the growth of NAI as a professional organization was the initiation of a training and certification program. NAI now certifies interpretive managers, planners, and trainers, as well as front line interpreters. While certification conveys credibility, the real value of the program is in the training that leads to the certification. All of us, no matter how experienced, benefit from the wealth of ideas and techniques developed by the U.S. National Park Service (NPS),

Visitors Bill of Rights:

- I. To have their privacy and independence respected.*
- II. To retain and express their own values.*
- III. To be treated with courtesy and consideration.*
- IV. To receive accurate and well-balanced information.*

universities, and our colleagues, that have been included in the NAI program. This sharing of ideas and techniques is a natural fit for Chicago Wilderness.

Since its inception, the Education Team of Chicago Wilderness has hosted roundtables for sharing information and ideas among members. In August, 2001 the first roundtable devoted to interpretation was attended by more than 50 people, the largest gathering of its type up to that time. An emergent theme was that few interpreters had any formal training. In a post-roundtable lunch discussion, an ad hoc group that would become—and remains—the core leadership of the Interpreters task force was introduced to concepts from NPS training, including the interpretive equation and the visitor's bill of rights.

The task force hosted the first CW interpretive training workshop in February, 2002. Supported by a CW grant, the workshop was facilitated by Tim Merriman, Executive Director of NAI, and NPS trainers Neil Howk and Smitty Parrat. Task force organizers were convinced of the value of the NAI training and certification program at that and subsequent workshops, but time, budget, and travel limitations prevented most CW interpreters from attending NAI training workshops. Thus a grant application was prepared to host a "train the trainers" workshop, leading to NAI designation of CW representatives as Certified Interpretive Trainers. A capacity enrollment of 24 representatives of CW member organizations attended that workshop, held at the Morton Arboretum in January, 2005. Many have now met all the requirements to conduct Certified Interpretive Guide (CIG) training on behalf of the NAI.

NAI requirements for "entry level" CIG certification include:

- attendance at all four days of a workshop conducted by a certified trainer;
- successful completion of a written test taken from a core of six text and reference books on interpretation;
- preparation of an outline for a 10 minute thematic interpretive program; and
- presentation of the outlined program to the class.

Certification is valid for four years and may be renewed upon documentation of qualifying continuing education credits. Membership in NAI is not required to maintain certification, but it does offer the additional benefit of various publications, workshops, and other professional services. Region 5 (Illinois, Wisconsin, Iowa, Minnesota, Nebraska, North and South Dakota, and Manitoba) of the NAI is a member of CW, with more than 400 individual members, about 100 of whom work in the CW area.

The FPDCC conducted its first CIG training workshop in July, 2005. Full time and part time interpreters attended, as did staff from the Fisheries and Resource Ecology sections.



*Comments following
FPDCC workshop
included:*

*“(The workshop) inspired
me and motivated me to
do more than what I have
been doing.”*

*“(I learned) helpful things
pertaining to interpretive
approaches.”*

Steps in CIG training include: *history of the interpretive profession; knowing the audience; knowing the resource; program development; and program delivery.* *Knowing the audience* includes meeting their basic needs of comfort and safety, understanding differing learning styles, getting to know them as individuals, and techniques for stimulating thought and action. *Knowing the resource* covers research techniques, presenting balanced information, and understanding what the audience is most likely to care about. People generally will not remember facts and data, but will relate to good stories, unusual information, and emotional or inspirational ideas. Methods for relating tangible objects (the items or places interpreted) to intangible ideas that the audience will leave with (such as emotion, provocation and inspiration) is a core element of the interpretive process.

Program development is “the interpretive approach.” All interpretation serves a purpose; it is not about entertainment, but about what people will remember and do. Interpretation “...should always encourage visitors to DO something.” (Veverka 1994). The four key elements are that interpretation is enjoyable, relevant, organized, and thematic.

NAI interpretive training is built around a thematic approach. A theme, unlike a topic, conveys the primary message of the program, the “so what?” about the topic (Ham 1992). As presented in the NAI Certified Interpretive Guide workbook (Brochu and Merriman 2001), stating a theme provides the road map for the visitor’s journey through the presentation. At the end of the journey the visitor should be able to tell where you ended up (the theme) and how you got there.

Program delivery includes such techniques as question and

response strategies, use of props, appropriate use of demonstrations, guided tours, and other program types, nonverbal communication, and other personal presentation tips.

Values of Interpretive Training in Chicago Wilderness

Improving and enhancing interpretive services within CW directly addresses several goals stated in the *Biodiversity Recovery Plan*. Specifically, trained interpreters reach “communities with non-school programs,” “help foster community based programs aimed at improving biodiversity locally,” and “provide urban populations with opportunities to become aware of and explore the region’s natural communities.” The Interpreter’s task force has scheduled a workshop in interpretive writing (February, 2006) and will promote peer review and evaluation of interpretive programs, among other projects.

NAI offers several additional certification categories. The FPDCC will soon offer Certified Interpretive Host training to staff. CIG training is intended for beginning and experienced full time interpreters; host training is a shorter program for people who have public contact but do not present formal programs.

The interpreter’s role is to stimulate the interest, enthusiasm, and concern of citizens, in order to enhance biodiversity protection. The thematic approach to interpretation gives programs the clarity and focus that will provoke thought and action, and advance the mission and goals of CW and its member organizations.

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Learn what researchers from Purdue University Calumet and the Indiana Dunes National Lakeshore are finding as they investigate whether the addition of artificial shade, mulch, and mycorrhizae improves the survivorship of black oak seedlings in a sand savanna in northwest Indiana

Effects of Artificial Canopy, Mulch Application, and Mycorrhizae Inoculation on Restoration of Black Oak (*Quercus velutina*) Savanna in Indiana Dunes National Lakeshore

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Purdue University Calumet
Wendy Smith and Joy Marburger,
Indiana Dunes National Lakeshore

Introduction

Oak savanna is a wooded community with herbaceous groundcover and tree canopy cover (mostly oaks of various *Quercus* spp.) between 10 and 50%. Oak savanna ecosystems have been an integral part of the biodiversity in the Midwestern United States, supporting highly diverse flora and fauna that include many state- and federally-listed endangered species (The Nature Conservancy 1994; Chicago Wilderness 1999). Nuzzo (1985) estimated that the oak savanna once covered 11 to 13 million hectares in Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin prior to European settlement. During the 20th Century, over 99.8% of the oak savanna was eliminated or degraded due to human activities such as land clearance and fire suppression. Thus, the restoration of oak-savanna is among the top priorities for biodiversity recovery in the southern coast region of Lake Michigan (Indiana Dunes National Lakeshore, 1996; Chicago Wilderness, 1999).

Field experiments involving the manipulation of site conditions are essential to understanding the principles and procedures for a successful restoration (Choi 2004). For example, Temperton and Zirr (2004) noted that enhancement of site conditions and provision of propagules was critically important in providing an initial “kick” to ecological restoration. The purpose of this study is to investigate facilitation effects of three different site amendments (artificial shade, mulch application, and mycorrhizae inoculation) on survival and growth of black oak (*Quercus velutina*) seedlings that were planted in a disturbed dune site in Indiana Dunes National Lakeshore.

Description of the Study Area

The study site was located approximately 3 km south of the West Beach Unit of Indiana Dunes National Lakeshore

(Figure 1). It is a part of the Tolleston Dune system, which formed along the southern shore of Lake Michigan 1,100–3,500 years ago near Gary, Indiana. The predominant soil is Oakville series, characterized by well-drained fine sands (Soil Conservation Service 1992, Reshkin 1981). Black oak savanna was the most dominant vegetation type on the ridges of these sand dunes prior to extensive sand mining activities in the earlier part of the 20th Century. Nearly all vegetation was removed during the mining in the 1930s, and natural revegetation was extremely slow.



Figure 1. Geographical location of the study site and located within the Indiana Dunes National Lakeshore (INDU).

According to a study by Wilcox et al. (2005) in an abandoned sand mine in the West Beach Unit that was located adjacent (≈ 1 km north) to our study site, virtually no black oak seedlings were established in the elevated area with a low water table (≈ 3 m below ground surface). Diversity of herbaceous species was also relatively low ($H' = 1.10$). Lack of tree canopy, and low soil moisture and nitrogen were suggested as limiting factors for oak-savanna development in this area. Meanwhile in the low-lying area of the same sand mine, a relatively high water table (≈ 1 m) facilitated an extensive development of tree canopy cover ($\approx 50\%$) along with noticeable recruitments of oak seedlings (mean density 540 stems ha^{-1}) and enhanced herbaceous species diversity ($H' = 1.19$).

These results suggest that the oak-seedling development and higher herbaceous species diversity were facilitated by relatively abundant soil moisture and partial shade provided by pioneer trees, mostly cottonwood, in the low lying area with a high water table. Based on the results of Wilcox et al. (2005), we hypothesized that provision of artificial shade, application of mulch on soil surface, and inoculation of mycorrhizal fungi to seedlings' roots may enhance survival and growth of black oak seedlings.

Methods

Study site: Our study site (Figure 2), a part of the Tolleston Dunes system, is located south of US Route 12 in Porter County, Indiana. In the early 20th Century, extensive sand mining activities changed the landscapes of the dunes (Bailey 1917). In our study site, nearly all vegetation was removed when the dune was reduced from ≈ 200 m to ≈ 180 m above sea level by sand mining. Mining ceased around 1930 leaving a flattened sand plain with scattered depressions at or near the water table (Wilcox et al. 2005). Prior to the purchase by Indiana Dunes National Lakeshore in 2002, the site was occupied by an industrial (paint-testing) facility. Upon the purchase, the facility building was demolished for oak-savanna restoration. No major vegetation had developed on the site in 2003.

Acorn collection, germination and planting: Approximately 1,500 acorns of black oak were collected from the oak-woodlands near the West Beach in October and November, 2003 and stored in moist sand at 4°C until spring 2004. The acorns were germinated in the Purdue University Calumet greenhouse in April 2004. A total of 200 seedlings were transplanted four weeks after germination. To prevent potential damage by herbivores, a cylindrical seedling protector tube was placed over each seedling (Figure 2).



Figure 2. Experimental planting of black oak (Quercus velutina) seedlings in the restoration site on a disturbed Tolleston Dune, Indiana Dunes National Lakeshore.

Experimental treatments: Each seedling was subjected to one of the following treatments: artificial shade, mulch application, mycorrhizae inoculation, shade and mulch, shade and mycorrhizae, mulch and mycorrhizae, or all three treatments. Shade was established by wrapping the seedling protector tubes with black landscape fabric from the ground level to 20 cm height. Approximately 10,000 cm³ of ligneous mulch was applied on the ground surface surrounding the seedlings at a size of 35 cm x 35 cm and at a thickness of 9 cm. Prior to planting, two species of mycorrhizal fungus (*Pisolithus tinctorius* and *Scleroderma cirtium*) were used to inoculate seedling roots by dipping the roots into a gel solution containing the fungal spores.

Field monitoring: Solar quantum influx (amount of sunlight reaching each seedling) was measured at the top of each seedling on five random sunny days from May to September

2005 and then averaged. Soil moisture and temperature were measured for all seedlings at 12 cm depth biweekly from May to September in 2004 and in 2005. Height and diameter increments were calculated by subtracting the measurements in May from the ones taken in September 2005 for each seedling stem. In addition, the number of leaves was counted and the average length of the three largest leaves was calculated for each seedling in September 2005.

Statistical analysis: Student's t-test was used to compare (1) solar quantum influxes with and without artificial shade, (2) soil temperature with and without shade, (3) soil temperature with and without mulch application, (4) soil moisture with and without shade, (5) soil moisture with and without mulch, and (6) seedling survival and growth (increments in stem diameter and height, and number and length of leaves) with and without shade, mulch, or mycorrhizae.

Results and Discussion

Eighty-nine percent (178 of 200) of the black oak seedlings survived at the end of the 2004 growing season. Number of surviving seedlings decreased to 168 (84%) after the extreme drought of 2005. Of 168 surviving seedlings, 19 wilted during the drought. Resprout after wilting is common among black oak seedlings (Johnson et al. 2002). We found a certain degree of vigor (e.g., live vascular tissue in shoot) of the wilted seedlings and expect them to resprout in the spring of 2006. The mean increments of diameter and height for the 168 surviving seedlings were 0.06 mm and 2.7 mm, respectively, in 2005. The 149 non-wilted seedlings had an average of 3.6 leaves with an average length of 5.54 cm.

Although no statistically significant change was found in soil moisture and temperature, artificial shade reduced solar quantum influx approximately 74% from 1,470 to 384 $\mu\text{mol}\cdot\text{cm}^{-2}$ ($p<0.01$). The seedlings survived better with shade than those without. The seedlings with shade also grew taller with fewer but larger leaves than the ones without (Table 1). Such enhanced survival and growth were likely due to reduced water loss through transpiration from the seedling leaves in cooled ambient air that was caused by reduction in solar radiation. We need to measure ambient air temperature and transpiration rate to confirm this explanation.

Application of mulch decreased soil temperature by 19% (from 23.7 to 19.3°C, $p<0.01$) and increased moisture by 33% (from 54.4 to 72.6%, $p<0.01$) in 2004. The extreme droughts in 2005 have reduced these effects with 8% (from 24.4 to 22.5°C, $p<0.01$) decrease in soil temperature and 13% (from 46.3 to 52.2%, $p<0.01$) increase in moisture. Despite the increase in soil moisture, mulch application reduced seedling survival and the number of leaves (Table 2). We are now investigating potential cause(s) for such negative effects on seedling survival and growth. Inoculation of mycorrhizae had no or very little effect on seedling survival and growth (Table 3). No apparent effect on seedling survival and growth was found for the combined treatments (shade and mulch, shade and mycorrhizae, mulch and mycorrhizae, and all three).

Parameter	With Shade (n1)	Without Shade (n2)	p ^a	n1+n2
Survival rate (%)	82 + 2	69 + 6	<0.08	10
Diameter growth (mm)	0.06 + 0.03	0.04 + 0.03	>0.72	168
Height growth (mm)	3.99 + 1.52	1.13 + 0.22	<0.09	168
Leaf length (cm)	5.95 + 0.21	4.96 + 0.20	<0.01	149
Number of leaves	3.17 + 0.16	3.97 + 0.26	<0.01	149

a: probability of type I error in Student's t-test

Table 1. Effects of artificial shade on survival and growth (mean + standard error) of black oak (*Quercus velutina*) seedlings in Indiana Dunes National Lakeshore.

Parameter	With mulch (n1)	Without mulch (n2)	p ^a	n1+n2
Survival rate (%)	69	82	<0.08	10
Diameter growth (mm)	0.07 + 0.02	0.03 + 0.04	>0.32	168
Height growth (mm)	2.33 + 0.61	2.93 + 1.46	>0.71	168
Leaf length (cm)	5.56 + 2.56	5.45 + 1.80	>0.72	149
Number of leaves	2.85 + 1.16	4.11 + 2.11	<0.01	149

a: probability of type I error in Student's t-test

Table 2. Effects of mulch application on survival and growth (mean + standard error) of black oak (*Quercus velutina*) seedlings in Indiana Dunes National Lakeshore.

Parameter	With myco. (n1)	Without myco. (n2)	p ^a	n1+n2
Survival rate (%)	72 + 3	77 + 7	>0.52	10
Diameter growth (mm)	0.06 + 0.03	0.04 + 0.03	>0.72	168
Height growth (mm)	2.45 + 0.59	2.84 + 1.51	>0.81	168
Leaf length (cm)	5.44 + 0.22	5.56 + 0.23	>0.69	149
Number of leaves	3.76 + 0.23	3.32 + 0.20	>0.14	149

a: probability of type I error in Student's t-test

Table 3. Effects of mycorrhizae inoculation on survival and growth (mean + standard error) of black oak (*Quercus velutina*) seedlings in Indiana Dunes National Lakeshore.

In summary, the overall seedling survival rate of 84% by 2005 is an encouraging sign for successful restoration in this early stage. Particularly, we found that the artificial shade enhanced seedling survival and growth significantly in 2004 and 2005. Our ultimate goal is to establish, as prescribed by Wilcox et al. (2005), a black-oak

savanna that has approximately 500 black oak stems.ha-1 with 40 – 50% canopy cover and a relatively diverse native herbaceous vegetation ($H' \approx 1.2$) with 60 – 70% ground cover. Our monitoring of seedling survival and growth will continue until 2008.

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“If we are going to save environmentalism and the environment, we must also save an endangered indicator species: the child in nature.” Pg. 158

Book Review

Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder

Richard Louv

Algonquin Books, 2005

Reviewed by Colleen Kulesza

When asked to share happy childhood memories, chances are most people will describe outdoor activities that are either directly related to nature or take place in an open space. Growing up, many people had tree houses, went on make-believe adventures, made mud pies, caught bugs, kept pet turtles and frogs, climbed trees, and explored forests and fields near their homes. These moments in our childhood helped us to grow, learn, be creative, bond with family and friends, and exercise our playful side. Most children don't have these priceless events today and it is creating problems for them in school and in society, as well as negatively impacting their mental and physical health, according to author Richard Louv.

Richard Louv is the author of seven books, a columnist for *The San Diego Union-Tribune* and one of the creators of www.ConnectforKids.org, a web-community dedicated to informing adults about ways to improve children's lives and experiences. He is also a naturalist who finds peace and inspiration in natural areas and green space. Louv's most recent book, *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder* explores the impact that nature has on people in general and children specifically. He sees the trend of less outdoor play and exploration as the root of many of our social and mental health problems. He coined the term 'nature-deficit disorder' not as a medical diagnosis but as a way to describe the tremendous impact the lack of exposure to nature has on a person. People require exposure to wild, green spaces in order to be healthy and happy. Research and anecdotal evidence support his hypothesis that nature is a healer and when people lose their connection to the land they, and society, suffer. He does more than lament the passing of our connection to the environment; he offers suggestions and detailed examples of actions that people, communities, and governments have taken to reverse this trend of nature apathy.

Louv begins the book by contrasting how people used to experience the outdoors and what kids think of 'nature' today. Some of the stories of adults' childhood memories are heart warming and arouse a smile. Other stories from today's

children who find nature boring, scary, or a waste of time are distressing. He quotes one child from a San Diego elementary school who stated, "I like to play indoors better, 'cause that's where all the electric outlets are." Another group of children played outdoors in an empty field one day and when it was recommended they go out there again the next day, they responded that they had already done that and it was not exciting enough. Examples of this ennui abound.

According to Louv, many children and their parents view nature as dangerous, dirty, valuable as scenery only, and a waste of space. Urban sprawl and growth are rewarded as a positive force. Nature play has been criminalized. Our litigious culture populated with covenant-controlled neighborhoods and scared land owners often prohibits children building tree houses, investigating creeks and ditches, or otherwise exploring nature in a non-structured manner. Children are offered television and video games instead of being sent outdoors to play. Ironically, these children's parents fondly remember their own time outdoors and realize how valuable it was to them, but still have difficulty allowing their own children to have these experiences.

Louv cites extensive research regarding the positive impact of nature and wild places on human well-being. This lends credence to his ideas and visions for the future. A large section of the book addresses the tremendous increase in children who suffer from Attention Deficit Hyperactive Disorder (ADHD) and how being in a natural space positively impacts them. Many doctors now recommend time in green space in addition to the standard prescriptions of pharmaceuticals. Exposure to nature, even if it is being able to see a tree and flowers out your window, reduces stress, inspires creativity, increases productivity, and creates happiness. Repeated studies continue to discover positive impacts of exposure to nature; something most people intuit.

According to Louv, our society is now in its third frontier of how we experience nature. The first frontier was one of utilitarianism, the next offered romantic attachment to the wild places, and finally we suffer from electronic detachment. This includes ignorance about the source of food, a disappearing line between humans and machines, better intellectual understanding of our relationship with animals, and tremendous growth of suburbs. He proposes moving into a fourth frontier that is a Green America with a well organized back-to-the-land movement.

Examples of options to reduce our nature-deficit disorder include greening of cities such as Chicago (which he discusses in detail). He also recommends changing our school systems to allow for more play outdoors in natural areas and move away from our test-focused-no-child-left-behind philosophy that has only served to increase and create stress and anxiety among even the youngest students. Other developed countries that acknowledge the benefits of educational practices requiring time spent outdoors show greater success in student performance than America. He even addresses the negative impact that environmental educators and nature centers may have inadvertently had on children by creating fear and apathy. Children should be taught to enjoy nature, be awed by it, and explore it rather than being taught that the waters are toxic, "the air will kill you", and "pretty animals all over the world are dying because of you". Louv also sees a need to reform the basics of high school and college science education. He recommends bringing back the intensive nature study rather than the increasing focus on theory, microbiology, and computer technology. In simplest terms he recommends that all people spend more time outdoors.

In the final chapters Louv explores the spiritual essence of being outdoors and how the connection of nature to deity and faith are forever intertwined. Regardless of the denomination or path, nature and stewardship of the land are key themes. He sees this connection as part of the strength in conserving and experiencing nature.

The weakest component in the book is the somewhat idealistic view in his overall solution. Although the concept makes sense, I fear that his solution is unfeasible and would require such a large paradigm shift that it will not happen in my lifetime. Yet, if only a few of Louv's changes are made, the ramifications will be great. Nothing bad can come from an increased exposure to the environment.

Science. Society. Children. Education. Playfulness. Spirituality. Wisdom. These are the key themes in Louv's book. Without these, we would be doomed to watch the gap between people and nature widen with children being the first casualty. In order to create a better reality we need to move beyond our current cultural norms and get back to the basics of connecting with the land in the simplest and most profound ways.

If you have time to read only one book in the coming year, make it this one. Regardless of your field of study, whether you are an educator, researcher, land manager, developer, business owner, or homemaker, this book will inspire you to make the most of your time here and create the positive impact that you desire.

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About the *Chicago Wilderness Journal*

The CW Journal is published by the Chicago Region Biodiversity Council (Chicago Wilderness) on its web site (www.chicagowilderness.org) three times per year: in March, July, and November.

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