The Challenges and Opportunities of Restoring Ecosystems in Urban-influenced Areas: Insights from Northeastern Illinois

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As the population of the United States increases and new development sprawls out across the landscape, ecosystems are greatly impacted. Sprawl and the competition for undeveloped land outside urban areas makes it especially important that we make the most effective use of the existing bank of reserved open space. Meeting goals of ecological health and connectivity at the same time that undeveloped lands are being converted to urban areas means that we have to pay closer attention to the integrity of natural areas within the urban system. Restoration is one of the best means that we have for accomplishing these important goals. The practices of "healing" degraded ecosystems through ecological restoration are becoming more effective with advances in scientific knowledge of how ecosystems function, as well as more practical experience in restoring ecosystems.

Taking only biological and ecological factors into account, the means for restoration in the face of sprawl may be relatively simple—set aside more land, restore already preserved lands to more pristine conditions, and minimize human impacts. However, biological and ecological systems cannot be isolated from the human context in which they exist, which is why the restoration process is far from simple. As people and associated developments expand into the landscape, the ecosystems change, and so does the social context in which they exist. These physical, biological and social changes have important implications for the way that we plan and carry out resource management. What has been happening with the restoration movement in northeastern Illinois is a good example of how the challenges of restoring ecosystems in urban influenced areas may be turned into opportunities for peaceful coexistence between large human populations and healthy ecosystems.

The Situation in Northeastern Illinois

Northeastern Illinois is a diverse landscape that owes a great deal of its character to the Wisconsin glacier that covered much of Illinois and receded

only 13,000 years ago (Chicago Wilderness 1999a). In its wake it left Lake Michigan, rich prairie lands, dunes, forests, woodlands, and wetlands. The large lake and associated system of waterways formed an excellent base for a transportation hub for the developing nation.

Beginning in the 1830s, the landscape was manipulated and changed in the name of progress. The wetlands were drained and the prairies plowed for farmland. The woodlands were cut to provide fuel and building materials. The dunes were flattened, railroads were built and steel mills established. An industrial hub of Chicago, Nature's Metropolis, was born (Cronon 1991). Despite the rapid pace and large scale of development, early planners had the foresight to set aside areas as forest preserves. Legislation establishing the Forest Preserve District in Cook County, Illinois was enacted in 1913 (Wendling et al. 1981). Forest preserve or conservation districts were subsequently established in the other counties in northeastern Illinois. In other instances, just by chance in some cases, small pockets of natural areas were left relatively undisturbed throughout northeastern Illinois.

The population of the city of Chicago peaked in the 1950s at about 3 million. Although the city's population is 2.8 million today, the population of surrounding areas has dramatically increased, and the Chicago region now includes more than 8.5 million people. Not only are populations increasing, but of even greater consequence for ecosystems, people are spreading out across the landscape. In northeastern Illinois, it is projected that over the next 10 years, developed land area will increase at more than twice the rate of population growth (Openlands Project 1999). This phenomenon, often referred to as sprawl, makes issues related to the preservation and restoration of natural areas near urban centers especially urgent.

In this paper, we use northeastern Illinois to illustrate the intricacies of relationships between people and ecosystems in our modern urbanizing world. Issues similar to the ones we highlight here are being faced in places across the country and the globe. The purpose of this paper is to share what has been learned in northeastern Illinois so that it can inform resource management elsewhere. The discussion begins with the growth and development of ecological restoration and provides brief descriptions of restoration efforts from northeastern Illinois. Next, challenges that have emerged in carrying out restoration are discussed. The final sections present lessons learned from addressing the challenges and future implications for restoration in northeastern Illinois and beyond.

New Insights and Knowledge

With expanding experience from hands-on practice and conduits for shar-

ing information, such as the journal *Restoration Ecology* (formerly *Restoration and Management Notes*), the field of restoration ecology has come a long way in the last few decades. Many of these advances have taken place through the work of volunteers and scientists in northeastern Illinois (Stevens 1995). Goals of these restoration efforts include bringing presettlement vegetation back to the landscape, restoring ecological processes, creating wildlife corridors, and improving habitat for migratory birds and native fauna.

Along with these advances in the practice of ecological restoration, a broader landscape view of the management of natural systems has emerged. Although the increasingly popular labels landscape ecology, ecosystem management and sustainable development vary in nuance, their overall goals are similar. The trend is toward holistic management across the landscape with an aim of sustaining ecosystems.

Opportunities for such holistic management often are discussed in terms of large areas of lands that are protected—such as national forests and national parks, and more locally in extensive forest preserves—but they do not need to be limited to these areas. There also are exciting opportunities for ecological restoration and improvement of habitat on the fringes and even in the middle of urban areas.

In northeastern Illinois, areas that have the potential to serve as important sites for ecological restoration include forest preserves, city parks, former industrial sites, urban river corridors, and railroad rights-of-way. Restoration in each of these circumstances is outlined below.

The Restoration of Forest Preserves

Joseph Nevius, General Superintendent of the Forest Preserve District of Cook County identified three eras of the development of the Cook County Forest Preserve system (Stewart 1995). In the first era, from the 1920s through the 1950s, the emphasis was on land acquisition. From the 1950s through the 1980s (the second era), more effort was put into developing and constructing facilities. Today, the Forest Preserve District of Cook County has holdings exceeding 68,000 acres. However, since the time of acquisition little ecological maintenance has occurred on these lands. Isolated from ecological processes such as fire, lands on the preserve have been overtaken by exotic species that out-compete native tree seedlings and understory plants. The current era, beginning in the 1990s, is the era of restoration of both natural and built features in the Cook County Forest Preserve system. Restoration also has become an important component of the activities of other forest preserve and conservation districts in northeastern Illinois.

The Rehabilitation of Lakefront Parks

Early planners also saved Chicago's lakefront from development (Wille 1972). However, a great deal of manipulation has occurred, and in the extreme case this has consisted of creating lands where they did not previously exist by using fill excavated from subway tunnels. These lakefront parks for the most part exhibit the well-manicured and designed character of many urban parks. However there are places that by chance have evolved into wilder places that serve a number of ecological functions. For example, Montrose Point in Lincoln Park has become an important stopover for migrating birds (Gobster and Barro in press). Major efforts are underway to restore this area as well as other sites in Chicago lakefront and neighborhood parks.

Reclamation of Former Industrial Sites

The Lake Calumet area on the southeast side of Chicago was once the hub of a booming steel industry. Lake Calumet, originally an expansive natural lake and wetland, was dredged to allow passage of larger ship traffic and filled in on its edges for waste management. Nevertheless, unique natural resources remain throughout the Calumet area. The area is still the site of several large landfills, but things in the Calumet area are changing. The city is not allowing new landfills, existing landfills are being capped, and the opportunity has arrived to highlight the area's more natural setting and restore some of its natural splendor. The City of Chicago's Department of the Environment and Department of Planning and Development are working on plans for rehabilitating this area. A number of public agencies, private firms and local groups are eager to become involved with the restoration process in the Calumet area.

Chicago River

The Chicago River has undergone several transformations since the early settlement days when it was a wide river that meandered through prairies, savannas and the new settlement of Chicago (Gobster and Westphal 1998). The river was channeled for flood control and, in 1900, the flow of the river was reversed to reduce contamination of Lake Michigan. For many years the Chicago River was perceived as more a detriment than an asset to the Chicago area; but clean water initiatives in the 1970s began to bring improvements in water quality. In the late 1970s, a group of concerned citizens formed "Friends of the Chicago River." It's goals were to protect and improve the environmental quality of the Chicago River and its related waterways, encourage appropriate economic activity and development that are sensitive to the environment, and increase awareness, involvement and appreciation of the river by the public and policy makers. Since the late 1970s, the quality of the water in the river has increased dramatically. In addition, the river is the site of increased levels of

water-based recreation such as canoeing and kayaking, and in some places even fishing. Ecological restoration activities are underway in some areas of the Chicago River corridor and many more are planned.

Rails-to-trails

In its early days Chicago was the hub of commerce for the industrializing nation. The railroads fanned out in all directions across the landscape. With the advent of the interstate highway system in the late 1950s and expansion of the trucking industry, the railroads decreased in importance and many of the rail lines were abandoned. They have been rediscovered by recreationists and conservationists. Not only are the abandoned rights-of-way being adapted for bicycle trails; but, because they were set aside for all those years, they are now serving as a source of seeds and plants of species that have disappeared or been out-competed in other more heavily manipulated areas. Former railroad rights-of-way are an important component of Chicago area's greenways and figure prominently in future greenway development and enhancement efforts (Northeastern Illinois Planning Commission and Openlands Project 1992).

Challenges for Attaining Restoration Goals

Many opportunities exist for improving natural areas within urban and urbanizing areas and linking these areas with natural areas in less developed settings by establishing corridors that facilitate the movement of wildlife and people across the urban system. At the same time, there are numerous challenges to these efforts (Gobster 1997, Ross 1997, Shore 1997). The experience in northeastern Illinois suggests that these challenges are not insurmountable, but they do need to be addressed in order for ecological restoration programs to receive the public support that is essential to their success. In some instances these challenges and the resulting responses have had the end result of strengthening the restoration movement.

The challenges to ecological restoration can be categorized into four areas: land ownership/jurisdiction; perceptions of species; implementation; and different types of knowledge. Each of the four challenges will be discussed briefly using illustrations from events in northeastern Illinois in recent years.

Land Ownership/Jurisdictions

Since natural resources do not adhere to jurisdictional boundaries, land ownership can become a challenge for ecological restoration. When there are areas of adjacent lands managed by different groups, conflicts can arise. For example, while the Forest Preserve District of Cook County designates 80 per-

cent of its land for preservation and 20 percent for recreation, an adjacent city park may have recreation and esthetics as a priority, or a nearby private landowner may make entirely different management objectives. These differences who has it difficult to manage critical habitats across the landscape. These challenges are increasing as urbanization brings increased fragmentation of ownership across the landscape. Collaborative stewardship efforts such as those underway under Chicago Wilderness (1999b) offer promise for improved linkages in management across land ownerships.

Another way jurisdictions can come into play is within the same agency or organization where different groups support different priorities for management. This can be illustrated by what has occurred during the planning for the future of Montrose Point in Chicago's Lincoln Park. People with different backgrounds and responsibilities within the Chicago Park District diverged in their views of what this area ought to be in the future. Most of these differences centered around the many roles that Montrose Point could play for park users. The desirability of adhering to the original landscape plan for the area was a particularly difficult issue (Gobster and Barro in press).

A less traditional way that jurisdiction has come into play is when different groups who may not technically have jurisdiction assume stewardship of an area. This has been the case with lands managed by the Forest Preserve District of Cook County. For more than 30 years volunteer restorationists have been working on restoration of some prairie and savanna sites on District lands. After some time these individuals and groups become personally attached to these areas and their management (Ross 1994, Stevens 1995, Schroeder in press,). The issue of the responsibilities of volunteers on public lands in the Chicago area came to a head in the autumn of 1996 when residents living near one of the restoration sites objected to the restoration activities that were taking place. One key point of concern among residents was what appeared to be "unsupervised volunteers" who were private citizens or members of not-for-profit groups manipulating the vegetation on public lands. The issue of who was in control of restoration activities on public lands — volunteers or the managing agency — came to be one of the central factors in the restoration controversy (Gobster 1997).

Perceptions of Species

Plant and animal species are viewed in different ways by different people, which provides a challenge to those interested in conducting ecological restoration. While biologists and ecologists may view animals as part of a population, the general public may see animals as individuals and even attribute human characteristics to them. What a biologist sees as culling a herd for the good of the population may be murder to an animal rights activist. Animal rights activ-

ists have played a very active role in the restoration controversy, particularly with respect to the desirability of reducing deer populations.

New issues are introduced when including the differences in the role or function of plants to different groups of people. While a restoration ecologist may see the plant as a component of an ecosystem that complements other species and is part of a natural mix suited to the site, others may see its role quite differently. One plant prevalent in the Midwest and reviled by ecologists as a competitive exotic invasive is European buckthorn, which shades out native understory plants. However, homeowners value the species for its attributes as a living fence and visual barrier (Gobster in press). Utility and transportation agencies may plant buckthorn to screen trains and relay stations. Birders may value buckthorn for providing midlevel canopy structure, bird habitat and food, and improved opportunities for viewing.

Trees often have high values to urban residents for a wide range of purposes (Dwyer et al. 1992). However, some efforts to restore prairie, savanna and woodland environments may involve the removal of trees that are not thought to have been part of the presettlement vegetation on those sites. Tree removal in these situations can generate significant controversy among those who place high values on urban trees.

Implementation

The means used to restore "degraded" ecosystems to more natural conditions are not always gentle. For example, to remove buckthorn successfully requires cutting, followed by direct application of herbicides on the stumps and then by prescribed burning. This does not occur just once but must be continued for a number of years until a competitive advantage is gained by native species, and even then constant vigilance may be required. Consequently this disruption of plant communities can continue for an extended period of time. Objections to management practices such as removal of trees and brush, applying herbicides, burning, and removal of deer emerged as important concerns in the restoration controversy (Gobster 1997).

Several process- and context-related issues concerning the implementation of restoration also emerged during the controversy (Gobster 1997). These included a perceived lack of public information on planned and ongoing restoration activities, insufficient opportunity to participate in restoration planning, lack of written plans and a well-defined planning process for restoration, and questions concerning who was in charge of planning and carrying out restoration activities—the public agency or the volunteers.

Different Types of Knowledge

Another important dimension of the controversy over ecological restoration in the forest preserves is the validity of different types of knowledge about ecosystems and their management. Scientific knowledge has been cited by restorationists as the authority for their efforts. Helford (in press) found that residents living near the forest preserves had a different type of knowledge about the sites. They sometimes disagreed with the scientists cited by the restorationists. These residents also sometimes worked with other scientists who held different views of ecosystem restoration.

There are a number of reasons why knowledge has been a particularly significant issue in the restoration controversy: (1) the exceptional complexity of the ecosystems in question that are being worked with, (2) limited research on these systems and how they are likely to respond to management, and (3) the significant amount and wide range of intimate experiences that restoration volunteers and local residents have with the sites where restoration is taking place. Given the high level of disagreement concerning these ecosystems and how they are likely to respond to management, Cook County officials formed an advisory board that included citizens from around the county to guide restoration activities. The scientific leanings and backgrounds of those on the advisory board emerged in heated debates during panel deliberations. Knowledge is likely to remain an issue in the restoration controversy for some time. There is still much to be learned about ecological restoration, including the long-term outcomes of management practices and the acceptability of these practices to nearby residents, other site users and the public.

What We Have Learned: Building on Opportunities

Although challenges to ecological restoration in northeastern Illinois continue, they have brought many lessons and new opportunities for improving restoration activities.

Listening

By listening to the many views of those concerned with ecological restoration, managers can develop better, stronger plans that have a greater level of support from the public.

Clear and Logical Plans

Among the most important lessons learned from the northeastern Illinois experience is the need for management agencies to have a clear and logical plan. One of the factors that seemed to alarm citizens most about ecological

restoration taking place in the forest preserves was the apparent lack of an overall plan. Time and again, citizens asked if such a plan existed. It seemed that citizens were not necessarily always questioning the expertise of those responsible for the restoration activities. Instead, they just wanted to know that it had been thought through and that the outcome would not be a surprise.

This desire to see and know that there was an overall plan came up in another recent study where we were investigating public perceptions of potential control strategies for an exotic invasive, the Asian longhorned beetle. Residents of one of the neighborhoods hardest hit by the infestation wanted not only to know the eradication plan, but they also wanted to see the plan for replanting the neighborhood after infested trees had been removed. Participants in that study stressed the need for a plan and sound justification for it, especially when the situation was changing.

Relevant Information and Communication

Sound, relevant information and communication between the public and resource managers are also critical. Parties to a controversy need to be open to listening and realize that there are strongly held positions on all sides of an argument. It is helpful if people are willing to listen and learn, and reach a judgment about the position of those they disagree with based on a fuller understanding of their position, rather than based on selective sound bites.

Recognize More Than One Public

Managers also need to recognize that there may be more than one "public," and that these different publics may have different concerns and values regarding natural environments. In fact, considerable diversity of viewpoints can exist within a single interest group or organization. Public involvement should occur early in the process of planning for restoration of an area or responding to a "natural disaster" such as the infestation of neighborhood trees by the Asian longhorned beetle. Early public involvement paid huge dividends in planning for the restoration of the Chicago River and its corridor as well as Chicago's Lincoln Park (Gobster and Westphal 1998, Chicago Park District and the Lincoln Park Steering Committee 1995). In the matter of ecological restoration, experts need to recognize that there is a generally low level of technical understanding among the public concerning biodiversity, ecological processes and ecological restoration (Barro and Bopp 1999, Barro and Bright 1998). This is not to say that the public cannot help guide the planning process. In fact, many members of the public are very insightful, eager to learn and become involved in planning and can contribute greatly to developing a plan that will receive widespread public approval.

Use Collaborative Approaches and Demonstration Projects

Chicago Wilderness (CW) is a consortium of nature-based organizations that have joined together to foster support for preservation and restoration of natural areas in the region. CW has spent a lot of energy thinking about means and opportunities for improving communication about these complex issues. From their efforts we learn the value of presenting a coordinated and reinforcing message from the host of organizations that speak about the natural environment. Demonstration projects where people can see first-hand the processes and outcomes have proven to be effective tools in starting dialogues with people. Examples include The Grove, Swallow Cliff and Midewin National Tallgrass Prairie. The Biodiversity Recovery Plan (Chicago Wilderness 1999b) provides a great deal of information on ecological restoration in northeastern Illinois and communicating about it with the public.

Tap Into Groups That Already Exist

Tapping into groups that already exist and have activities centered on the natural world is another way to improve communication. These groups include Audubon, Sierra Club, Nature Conservancy, tree care volunteers (such as the group Treekeepers in the Chicago area), and the Volunteer Stewardship Network in Illinois. These people are generally local and can help to bridge the gaps between scientists, managers and citizens. However, in developing working relationships with such groups, it should be recognized that each group has a particular interest in and perspective on the natural environment and its management and use that may emerge in the group's communications with others.

Be Willing to Compromise

The willingness and ability to compromise is critical for a mutually acceptable plan to go forth. This doesn't necessarily mean that everyone loses. Gobster and Barro (in press) talk about participative planning and how a third party can help to negotiate a conclusion. Examples of compromises that can be effective include, for example in the case of prairie restoration, leaving hedges on the edges of the site to block out street traffic or nearby businesses and parking lots. In other cases, it can involve slowing implementation, such as letting the big tree die naturally, or the honeysuckle hedge being gradually replaced by other more natural species.

The Future and Implications for Other Areas

The progress being made in northeastern Illinois with respect to large scale, coordinated ecological restoration efforts is a valuable model for resource man-

agement in other urban and urbanizing areas as well as many non-urban areas. Thoughtful planning, public involvement and communication are essential in the success of restoration at the small and large scale. As the scale of work increases, the effort becomes more complex but the basic tenets for success hold true.

Lessons learned from northeastern Illinois demonstrate that out of challenges come opportunities for higher levels of public involvement and understanding. A true dialogue between managers and the public guarantees that both parties will benefit. Effective dialogue requires true and open listening to alternative viewpoints, and must occur early in the process. Scientific information is a useful tool to help guide decision making; however, it should be used in context with information on the values expressed by the public. Balancing scientific information on ecosystems and their management with public values is a difficult challenge for planners and managers. In addressing that challenge, it may be useful to initially look to science for facts and to the public for values.

People are interested in natural resources and their management, but they are also busy. They want information that is relevant, easy to acquire and comprehensible. They are willing to learn about the natural environment and its management. They do not want to be listened to just for the sake of listening, and they can see through superficial gestures. They are not necessarily against having experts make decisions, although they want to be told the truth and to have their concerns heard and responded to, even if it is to say that what a person suggests is not feasible. This was very clear in discussions of Asian longhorned beetle control strategies with residents of neighborhoods where the pest had become established.

Informed, bi-directional public involvement can also lead to greater support for ecological restoration programs in the form of monetary support as well as in-kind and volunteer labor support. This support also can form the basis for strengthened constituencies for the acquisition of more natural areas. The greater and better job public and private agencies do in bringing the people into the planning and decision-making process and engaging them in what is happening, the more likely it will be that ecological goals can be met.

Northeastern Illinois and Chicago are not unique in the types of people who live there or the types of challenges facing people trying to balance the natural and the built worlds for the benefits that both can provide. What has worked here also may work elsewhere.

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