



# NATURAL AND CULTURAL RESOURCES MASTER PLAN

*Managing our ecosystems and heritage  
for the next century*



## Message from the President



Visionary leaders a century ago realized how important it was to set aside natural, open space to be enjoyed by everyone. Though our county has grown into one of the densest urban areas in the country, we are never more than a short trip away from nature. We are benefactors of what has grown into 69,000 acres of land containing some of the most diverse plant and wildlife species in North America.

I have spent a lot of time over the years learning about the prairies, wetlands, savannas and forest habitats that surround us. Each time I enjoy an activity with my grandchildren surrounded by nature, it is clear we have a responsibility not to squander this rich inheritance, especially for future generations.

The Natural and Cultural Resources Master Plan was created to guide our restoration efforts into the next century. This document provides an assessment of the preserves and the framework needed to implement our ambitious goals of restoring 30,000 acres of land in 25 years.

I want to thank the Prairie Research Institute at the University of Illinois for developing this comprehensive plan in partnership with the Forest Preserves of Cook County. PRI is a leading organization with researchers from multiple disciplines who work to promote natural and cultural resource sustainability. Their skills and perspective have helped us realize these first steps and I look forward to our ongoing partnership.

**Toni Preckwinkle**

A handwritten signature in black ink that reads "Toni Preckwinkle". The signature is fluid and cursive.

*President, Forest Preserves of Cook County*

## Message from the General Superintendent



The Natural and Cultural Resources Master Plan is an invaluable tool that will help steer the Forest Preserves of Cook County into a new era. We have a history of trend setting, being the first ever forest preserve district in the United States as well as the largest, but we must also lead the way in preservation—one of our main tenets.

The Natural and Cultural Resources Master Plan offers a long range restoration plan on how to bring varying levels of developed and degraded land into higher states of ecological health. It is crucial that we maintain native habitats and their fragile species, many which are of conservation concern. Also accounted for are the cultural aspects of the preserves and their archaeological significance; a history dating back to Native Americans and European settlers. But the plan also looks to the future, outlining a strategy on land acquisition.

The Prairie Research Institute spent more than a year along with our staff gathering information in the field, and sifting through thousands of historical records and documents. Meticulous research and analysis was coupled with interactions with our volunteer network to set a course that can meet the goals outlined in our Next Century Conservation Plan. I thank the Prairie Research Institute staff for their work and collaboration. The restoration of our precious natural resource is paramount not only from a conservation perspective, but to provide quality of life for our region.

**Arnold Randall**

A handwritten signature in black ink that reads "Arnold Randall". The signature is cursive and stylized.

*General Superintendent, Forest Preserves of Cook County*

This Natural and Cultural Resources Master Plan for the Forest Preserves of Cook County (FPCC) focuses on conserving natural and cultural resources in concert with each other, and on both the people who are doing that work and those who benefit from it. Effective conservation requires understanding those resources; understanding the “place” or context in which they are found; and understanding the history, traditions, values, and attitudes of the people living in that place. Ultimately it depends on a shared understanding of the problems facing the region and a shared commitment to improving the conditions for the people, plants, and animals living there. This Natural and Cultural Resources Master Plan embraces the vision set forth in the Next Century Conservation Plan for the FPCC and is intended to provide an initial blueprint for its implementation.



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# Executive Summary

The Forest Preserves of Cook County is celebrating its 100<sup>th</sup> anniversary. From its initial 500-acre preserve, it has grown to encompass over 69,000 acres, including almost 50,000 acres of natural lands. The preserves are home to nearly 50 distinct plant communities, some found only in the Chicago region. They support a tremendous diversity of native plants and animals, including many species that are declining or even threatened with extinction. At least 550 archaeological sites are present within the preserves. These sites record continuous human use of Cook County throughout the last 10,000 years, from the first Native Americans who reached the region following the retreat of the glaciers through use of the preserves for World War II prisoner-of-war camps. The preserves are a tremendous asset for the people of Cook County, allowing them to experience nature and history in ways perhaps unequaled among major urban centers.

Unfortunately a variety of factors, many related to the preserves' urban setting, have seriously degraded their natural resources and threaten their cultural resources. The Forest Preserves' staff, volunteers, and conservation partners are striving to manage, restore, and protect these invaluable natural and cultural

resources. Their success is crucial to maintaining a high quality of life for the people of Cook County.

The 2014 Next Century Conservation Plan for the Forest Preserves of Cook County offers an ambitious vision for expanding the preserves and restoring the native landscapes they contain. This Natural and Cultural Resources Master Plan aims to provide the Forest Preserves with the guidance they need to implement the Next Century Conservation Plan's natural resource goals. It also provides a natural and cultural resources framework for future land acquisition, recreation development, and capital improvement.

In developing this master plan, the Prairie Research Institute at the University of Illinois consulted extensively with the Forest Preserves' staff, volunteers, and partners. Institute staff compiled and analyzed existing data collected over many years by the Forest Preserves and other organizations, institutions, and individuals. Staff also visited most of the preserves to assess their natural communities and the threats they face. This report summarizes their findings and presents recommendations for natural and cultural resources management. The Forest Preserves have also received technical reports providing more detailed analysis, the data compiled from all sources, and a Geographic Information System that integrates all geographically based information. These products will guide the Forest Preserves' natural and cultural resource management as they implement the vision of the Next Century Conservation Plan.

The Forest Preserves' natural and cultural resources face numerous threats. These include:

- Invasive exotic species that are displacing native plants and animals.
- Stormwater runoff and flooding that drown native plants, degrade wetlands, and wash away archaeological sites.
- Habitat fragmentation that isolates plant and animal populations, impairing their ability to recover from disturbance and adapt to changing conditions.
- Insufficient fire, leading to loss of diversity in the preserves' many fire-adapted natural communities and promoting the spread of invasive species.
- Overabundant deer, which destroy wildflowers and reduce woody plant growth, promote erosion, promote the spread of diseases, and increase the risk of deer-vehicle collisions.
- Poaching and collecting of plants and animals and looting and vandalism of archaeological sites, which degrade or destroy these resources.
- Altered water balance in wetlands, leading to their decline or disappearance.
- Erosion that removes the soil that sustains plants; degrades streams, rivers, and wetlands; and damages cultural resources.
- Water pollution that also degrades streams and rivers, making them inhospitable for the fish and other animals that live there.
- Development and recreation that, when in the wrong places, may destroy natural habitats and archaeological sites.
- Climate change, which may lead to unsuitable conditions for native plants and animals and increase damage from severe storms.



To minimize these threats, the Natural and Cultural Resources Master Plan recommends the following actions:

- Increase control of invasive species using mechanical removal and herbicides.
- Promote cooperation among the Forest Preserves, state and federal agencies, and local communities to alleviate stormwater problems.
- Plan stormwater management measures to minimize damage to archaeological sites and natural communities.
- Pursue natural and cultural resource management and land acquisition to maximize the size of preserves and the connections among them.
- Increase use of fire to promote plant diversity, benefit wildlife species, reduce invasive species, and create esthetically desired landscapes for preserve users.
- Increase management of deer and other wildlife, and a public education and engagement strategy with a special focus on neighboring landowners.
- Continue to monitor plant and wildlife diseases.
- Educate the public and Forest Preserve police about the signs and impacts of poaching and looting.
- Restore the water balance in affected wetlands.
- Combine education and enforcement to minimize creation and use of erosion-causing unofficial trails.
- Continue efforts that have significantly reduced water pollution in recent years.
- Plan future development of structures and recreation facilities, including trails, and habitat restoration activities, to minimize threats to archaeological sites.
- Conduct thorough archaeological surveys of the 80 percent of preserve lands that have never been examined and systematically evaluate known sites to determine their importance and management needs.
- Develop a strong base of citizens who are educated about the natural and cultural resources of Cook County, and who can serve as allies for the Forest Preserves.

The Forest Preserves must use their financial and human resources as effectively as possible. The Forest Preserves' staff do not work alone, but benefit from a long history of cooperation with volunteer stewards and partner organizations. To maximize their effectiveness, this Master Plan recommends that the Forest Preserves take the following steps:

- Use structured decision making to develop management plans that use the best available information, balance competing natural and cultural resource goals, and make the process more transparent to policy makers and the public.
- Continue to monitor resources and management outcomes.
- Adopt a conservation enterprise data system and other information technology solutions to improve efficiency, facilitate communication, and track processes and outcomes.
- Nurture the relationship among the Forest Preserves' staff, volunteers, partners, and contractors.
- Improve the process of conservation policy development and communication.
- Provide more opportunities for training and education about natural and cultural resources to staff and volunteers.

It is clear that achieving the ambitious goals of the Next Century Conservation Plan will require coordinated management and restoration across the preserves. To facilitate this, the master plan includes a Landscape Conservation Design that integrates public and private conservation efforts across Cook County. Major components of the design include Illinois Natural Areas, Illinois Land and Water Reserves, large areas of undeveloped land, areas with significant cultural resources, and areas of natural vegetation that can provide corridors and linkages among these conservation lands. The total acreage of lands in the design currently protected within the forest preserves system is 34,830 acres. An additional 13,438 acres are not under Forest Preserve ownership at this time and could be acquisition priorities to meet the Next Century Conservation

Plan's goal of 90,000 acres within the forest preserves.

Because the Landscape Conservation Design includes large tracts of land with widely varying natural quality, it is necessary to prioritize restoration efforts on smaller units. Priority for management and restoration follows this hierarchy:

1. Dedicated Nature Preserves and registered Land and Water Reserves
2. Other INAI Natural Areas, including those that are under recommendation
3. Lands currently under management that could be brought to high natural quality relatively quickly
4. Large parcels of undeveloped land surrounding priority 1–3 sites and judged to have high potential for restoration and registration as Land and Water Reserves
5. Other sites currently under restoration.

Among cultural resources, archaeological sites associated with human remains are legally mandated as the first priority for protection, followed by sites or groups of sites containing well-preserved information about the prehistory or early history of our nation, the region, or Cook County. The lands that meet these natural and cultural resource management priorities total close to 30,000 acres. Collectively they protect the highest quality or most important natural and cultural resources, optimize the return on previous management efforts, and promote the landscape connectivity essential for healthy ecosystems.

The costs of restoring and maintaining natural areas and of identifying and protecting cultural resources are significant. Embracing the Next Century Conservation Plan's vision of restoring 30,000 acres to high natural quality is estimated to cost between \$650 million and \$1.3 billion over the next 25 years. These estimates do not include the costs of cultural resource management or of land acquisition. These are significant investments, but the resources within the Forest Preserves of Cook County are, by any reasonable measure, priceless.



SECTION



# The Forest Preserves of Cook County

At the beginning of the 20<sup>th</sup> century, as urban development in Chicago and surrounding Cook County was rapidly expanding, several Chicago organizations sought to preserve remaining native prairie and forest as precious natural resources. Jens Jensen, a Danish immigrant and landscape architect, was a leader in this movement. His vision was to restore the deteriorating parks using native plants. He also envisioned a system of parks in inner-city neighborhoods, boulevards linking the nature reserves with the city's park system, and conservation of tracts of undeveloped land. Daniel Burnham, Chicago's renowned architect and planner, was enlisted to incorporate Jensen's ideas into the 1909 plan of Chicago. Although many of Jensen's specific plans were not realized, the movement to conserve natural areas was well underway. After many attempts and years of political debate, the Forest Preserves of Cook County was established in 1915.

# Land Acquisition for Forest Preserves



*"Instead of acquiring space only, the opportunity exists for reserving country naturally beautiful. The bluffs and beaches along the lake shore, the Skokee, the North Chicago River Valley, the Peterson Woods at Bowmanville, the Desplaines Valley, Salt Creek, Flag Creek, Mt. Forest, the Sag Valley, Palos Heights, Blue Island Ridge, Calumet River and Lake—all these should be preserved for the benefit of the public in both the city and its suburbs and for their own beauty and scientific value which, if once lost, cannot be restored for generations."*

- 1905 Report of the Special Park Commission

By 1916, the Forest Preserve Plan Committee began to recommend land for the FPCC to attain. The plan committee had been appointed by the president of the Cook County Board of Commissioners, Peter Reinberg, and included Dwight Perkins and Daniel Burnham, individuals who had helped craft the forest preserve idea. They were tasked to survey all land offered to the FPCC and make acquisition recommendations to the board. Recommendations relied heavily on the plans laid out by the Special Park Commission in its 1905 report to the City Council of Chicago and earlier surveys of the Municipal Science Club, both headed by Dwight Perkins. The Forest Preserves acquired their first property in 1916, purchasing 500 acres in what is now the Deer Grove West Preserve.

Land was to be acquired for the dual purposes of conservation and recreation, though there were some differences of opinion on the extent of these purposes. The land recommended in the report of the Special Park Commission had been considered for its proximity to current or future populations, esthetic appeal,

recreational capacity, and natural and cultural conservation values. Today, the larger mission to manage natural areas for conservation and recreation remains true, yet this mission has been refined and clarified through time, learning, and cultural shifts.

*"I am inclined to believe that the Chicago intramural park system...will be large enough to supply park needs within the city. What is needed to supplement this system is the outer preserves of forest and meadowland unimproved by the hand of man."*

- Henry Foreman, 1903 speech to Outer Belt Commission

The forest preserves idea differed from other county parks of the early 20<sup>th</sup> century by emphasizing the preservation of space in its natural, undeveloped state. Parks, supplemented with artificial plantings, had already been created. The forest preserves were to be natural areas and to provide citizens with a different kind of enjoyment: the scenic beauty provided by nature.

In 1929, the FPCC released a report advising that 75 percent of the land should be managed as forests, 14 percent should be kept open for recreation, 5 percent should be given to rivers and lakes, 4 percent should be made into golf courses, and 2 percent should be set aside for a zoological park and arboretum. This rule has changed and a more recent assessment has indicated an 80/20 proportion might be appropriate, with about 80 percent being given to natural areas and no more than 20 percent to recreation and development. The 80/20 guideline was a point of reference during the creation of the Forest Preserves' 2012 Recreation Plan and their 2012 Land Acquisition Plan. The preservation of natural areas is and will continue to be the key forest preserves concept for Cook County and surrounding areas.



# Creating an Interconnected System of Large Preserves

In addition to managing areas in their natural state, acquiring large, connected preserves was a priority for the first plan committee. This matched the recommendations of the Special Park Commission, which included the recommendation of two 8,000-acre preserves, one 7,000-acre preserve, three preserves between 1,000 and 2,000 acres, and 15 additional preserves over 100 acres. This was in stark contrast to the existing parks, which were generally limited to 10 acres or less. Areas of high acreage were desired out of an understanding that they provided greater ecosystem services, lent themselves to more immersive experiences for people, and presented the opportunity for more effective conservation of nature in its wild state.

The 1909 Plan of Chicago imagined a system of forest parks connected by wooded boulevards. In the 1920s, this idea was referred to as “The Forest Way.” Today, the Green Infrastructure Vision, created by Chicago Wilderness, echoes the mission to conserve large natural areas and promotes the creation of greenway linkages and wildlife corridors. The Green Infrastructure Vision informs the FPCC’s planning and was used extensively during the creation of the 2012 Land Acquisition Plan.

A majority of the Forest Preserves’ first acquisitions included rivers, lakes, and streams. By 1936, most property that had been acquired followed five of the county’s main waterways: the North Branch of the Chicago River, the Des Plaines River, Salt and Thorn Creeks, and the Little Calumet. The creators of the 1909 plan recognized that protecting the waterways was the key to protecting

the surrounding natural areas. Efforts to clean polluted waterways for the health of aquatic species began in 1921, and the Clean Streams Advisory Committee was appointed in 1931 to protect the waterways against factory pollution and sewage overflow.

The FPCC continues to focus on maintaining and restoring the health of the county’s waterways today through working with organizations such as the Metropolitan Water Reclamation District, Openlands, Friends of the Chicago River, and other coalitions, and by creating opportunities for volunteer cleanups of waterways.

THORN CREEK © C. BENDA



# Preserves for the People in Perpetuity

Providing natural areas for the enjoyment of the public has always been a part of the mission of the Forest Preserves of Cook County. In many ways, the idea of conserving natural areas was inspired by the need for open space. The idea that natural areas could help solve many of the ills of society such as overcrowding, increased mortality, the spread of infectious disease, juvenile crime, and delinquency was used as an argument by the Special Park Commission for the creation of the preserves. At a time when only those of privilege owned pieces of natural areas, the preserve concept provided a way for average citizens to enjoy the beauty of nature without trespassing. Emphasis was given to providing scenic areas in proximity to the most industrialized parts of the city. Today, one scarcely need walk into a forest preserves site to see individuals picnicking, fishing, hiking, biking, and studying nature much as they did 100 years ago.

There is a renewed interest in providing equal access to the preserves. The most recent land acquisition plan prioritizes the acquisition of lands in areas where currently there is limited access, even if it means attaining smaller pieces of land. It is noteworthy as well that providing public transportation to natural areas was recommended both in the 1909 plan and in the 2012 Land Acquisition Plan.

*"The Commissioners cannot consider themselves only temporary custodians of land and forests, or as an interim land-holding agency from which other public or private bodies may draw at will."*

- FPCC Advisory Committee, 1946

As development in the county continued to expand throughout the first half of the 20<sup>th</sup> century, the FPCC's success in setting aside land for conservation led other interests to want that "unused land" for competing purposes. In the 1960s the FPCC released *Land Policy*, a document that revealed numerous requests from

organizations and government officials for forest preserves property to be used as school grounds, club meeting places, and other uses. *Land Policy* contained letters between the advisory committee, government officials, and organizations going back more than two decades. Repeatedly, the advisory committee was contacted to give land and each time responded with a restatement of their policies. They steadfastly held onto Forest Preserves property and did not grant special privileges to requesters, no matter how well intentioned their requests.

Today, land surrounding the preserves has become increasingly developed, open space has become even more of a rarity, and pressure to give Forest Preserves land to other uses is constant. This pressure is not new, but it is met with the same tireless resistance demonstrated by earlier leaders of the preserve system.

VISITORS AT BLUFF SPRING FEN  
NATURE PRESERVE © A. BRANDON



# Moving from Preservation to Restoration

*"We take seriously the responsibility we have to ensure that generations of Cook County citizens, born and yet unborn, will co-exist until time beyond mind with the inspiring diversity and beauty of plants and animals, places and processes unique to the world."*

- FPCC Sustainability Doctrine 2012

During the first 100 years, these larger goals of conservation and recreation have remained constant, but what to conserve and how to recreate in these natural areas has been refined. When the preserves were established, forest conservation was the priority. This was the result partly of the legal process of trying to define the scope and goal of the preserves and partly of a cultural undervaluation of the environmental and esthetic importance of wetland and grassland ecosystems. Changes in

the perception of prairies and wetlands occurred over decades and involved both organizational changes and cultural shifts. Briefly, the first large-scale prairie restorations in the Cook County preserves occurred at Sagawau, Crabtree, and Sand Ridge nature centers and at Ned Brown Preserve in 1966. The North Branch Prairie Project began volunteer-led restoration of prairies, savannas, and woodlands in the 1970s. Today, marshes, sedge meadows, fens, bogs, and swamps are all protected and maintained by the

FPCC. The Forest Preserves of Cook County of the 21<sup>st</sup> century seeks to conserve woodlands, grasslands, and wetlands, and natural areas are managed to maintain and restore biodiversity.

PRAIRIE DROPSEED AT  
SPRING LAKE © C. BENDA

CHICAGO CONSERVATION LEADERSHIP CORPS  
AT DAN RYAN WOODS © A. BRANDON







SECTION

# 2

## Development of the Natural and Cultural Resources Master Plan

The Forest Preserves of Cook County is celebrating its 100-year anniversary. The preserves now contain over 69,000 acres, including almost 50,000 acres of natural land. From its inception, foresight has been the foundation of the preserve system and planning has been the framework on which its natural areas depend. The Forest Preserves of Cook County has reaffirmed the importance of foresight and planning through the development of the Next Century Conservation Plan, which called for completing the Natural and Cultural Resources Master Plan (NCRMP). The Natural and Cultural Resources Master Plan takes into consideration the context in which this report is being published and, like the structured decision making recommended by this report, it seeks to integrate and build upon the goals and recommendations of other related plans.

# Context for the NCRMP

The 2014 Next Century Conservation Plan was created by a commission of business and civic leaders for the Forest Preserves of Cook County. It is a broad vision for the next 100 years of the Forest Preserves. The goals outlined by the Next Century Conservation Plan were adopted to guide this resource master plan. Three goals are especially relevant: expanding the forest preserves to 90,000 acres, restoring 30,000 acres to high natural quality, and maintaining much of the remaining 60,000 acres in good ecological health. The Natural and Cultural Resources Master Plan will provide the FPCC with a baseline evaluation and framework for achieving these goals. For more information about the Next Century Conservation Plan see <http://www.nextcenturyconservationplan.org>.

The Natural and Cultural Resources Master Plan will be a valuable tool for the FPCC as it moves forward with acquisition, recreation development, and capital improvement. This plan will provide an ecological and cultural resource basis of consideration for plans the FPCC has released in recent years. In 2012, the land acquisition plan identified 20,000 acres of potential land to purchase. In identifying priority areas and providing a suite of helpful maps, the Natural and Cultural Resources Master Plan will help the FPCC determine which land to acquire.

The Natural and Cultural Resources Master plan will also add an important component to recreation planning by identifying areas that are compatible for active and passive recreation. This will provide ecological and cultural resource considerations to the 2013 Recreation Master Plan and the 2014 Trails Master Plan released by the FPCC. Similarly, this plan will inform the five-year Capital Improvement Plan as it moves forward with future development. It will also provide the FPCC with tools and information to plan for the most impactful restoration within the budget identified in the Capital Improvement Plan, while identifying and protecting important archaeological sites. These plans and others released by the FPCC can be found on the Forest Preserve website at <http://fpdcc.com>.

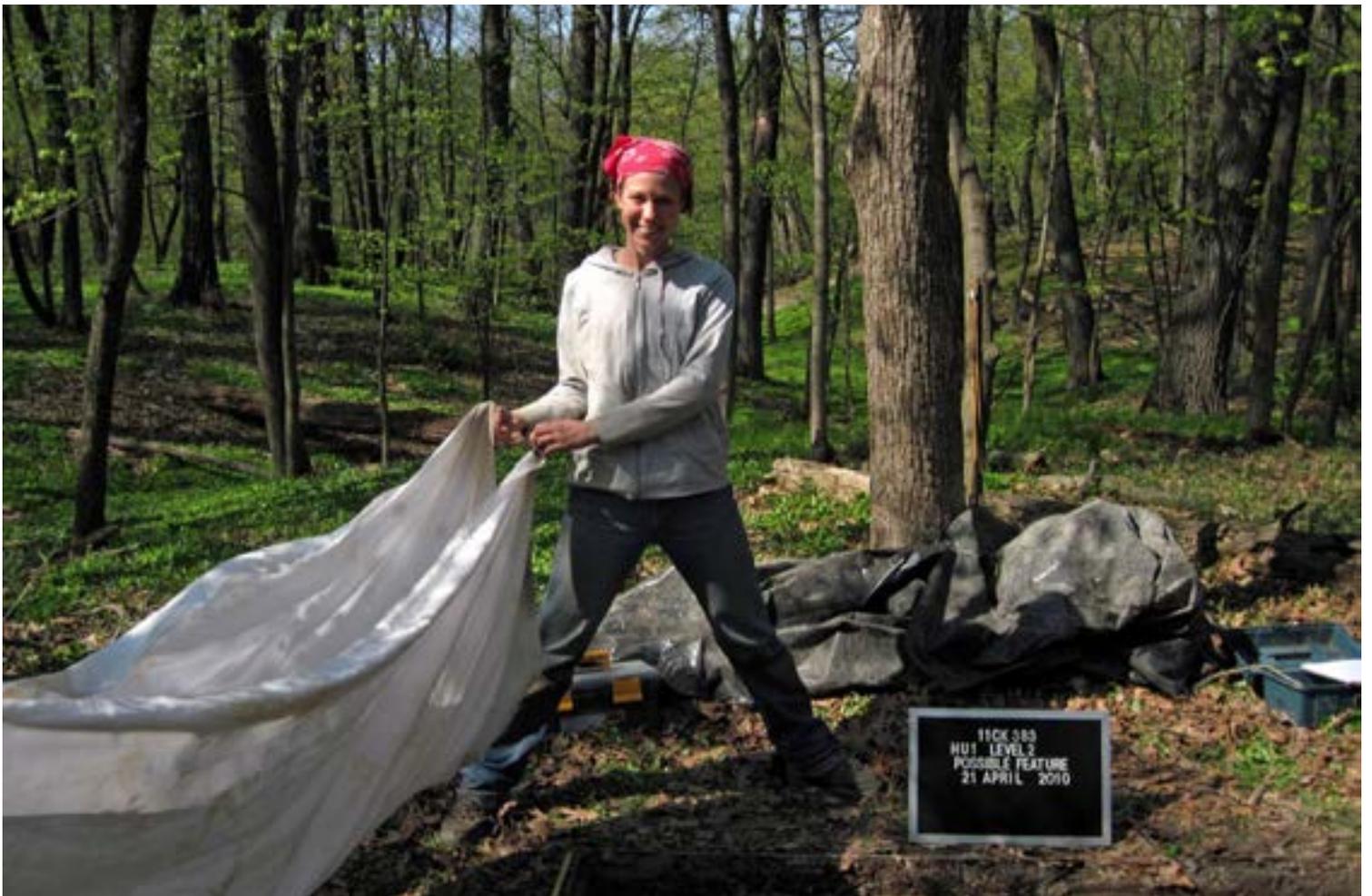
The Green Infrastructure Vision provides the Chicago Wilderness region with the vision of a healthy, connected network of natural areas which provides clean air, clean water, flood control, and recreation. The Natural and Cultural Resources Master Plan promotes this vision, and green infrastructure maps and concepts were used to inform this plan. Information about the Green Infrastructure Vision can be found at <http://www.cmap.illinois.gov/livability/open-space/green-infrastructure-vision>.

The Biodiversity Recovery Plan published by Chicago Wilderness in 1999 emphasized the importance of biodiversity on both species and landscape scales. The recovery plan identified focal species and landscapes and outlined strategies for the restoration and maintenance of diverse natural areas. The Natural and Cultural Resources Master Plan has included these considerations in its planning and promotes the importance of ecological diversity.

The Natural and Cultural Resources Master Plan will help to unite these other plans by providing a baseline assessment of natural and cultural resources, a foundation for future information gathering, and a framework for structured decision making.

The Natural and Cultural Resources Master Plan was created through a partnership between the Forest Preserves of Cook County and the Prairie Research Institute (PRI). Of the five branches of the PRI, the Illinois Natural History Survey (INHS), the Illinois State Archaeological Survey (ISAS), and the Illinois State Water Survey (ISWS) were the primary investigators for this plan. An internal advisory committee and an external advisory council were created to inform PRI as the plan was created. The internal advisory committee comprised key resource management staff of the Forest Preserves of Cook County. The external advisory council included leaders in affiliated organizations. Both of these advisory groups met with PRI staff several times during the year to provide relevant feedback and insight.





# Creating the NCRMP

**FIELD COMPONENT** A human dimensions specialist was employed to seek input from the Forest Preserves and a wide range of stakeholders. A combination of structured phone interviews, focus groups, public forums, mail surveys, and e-mail surveys was used. Input was sought from Forest Preserves staff and administrators, the internal advisory committee, the external advisory council, key stewards, interest groups, volunteers, and Cook County residents. Views were sought on: (1) major ecological and archaeological problems at the Forest Preserves; (2) management needs to address these problems; and (3) challenges that might impede implementation of the master plan.

Two plant ecologists conducted field surveys of most of the forest preserves during the 2014 growing season. During these visits, they assessed the current ecological condition of land owned by the Forest Preserves. To make their assessments, they followed standards laid out by a previous statewide inventory known as the Illinois Natural Areas Inventory. While visiting sites, they also noted the effects of management efforts and mapped current natural communities.

Archaeologists conducted preliminary field surveys from April through July of 2014, primarily in areas where capital improvement construction projects planned for that year had the potential to impact known archaeological locations. Ongoing archaeological surveys and evaluations of sites within the forest preserves are expected to continue into the future.

## COMPILATION OF EXISTING DATA

Information was collected from the Forest Preserves of Cook County, outside organizations and institutions, and volunteers. Forest Preserve staff provided the PRI with existing electronic information and access to paper-based records. A coordinator went to various FPCC locations and digitized about 12,000 documents. Volunteer site stewards were contacted to provide important site information and reports of data they collected, and to complete maps of important areas. Some stewards were contacted individually by INHS ecologists and ISAS archaeologists to provide further information. Individuals who had conducted relevant research in the preserves and organizations involved in restoration and monitoring in the preserves were contacted to contribute information.

Archaeologists gathered and digitized over 1,000 documents related to archaeological sites and investigations that have occurred on Forest Preserves lands over the past 100 years, including professional research reports, conference papers, notes, and maps made by local avocational archaeologists and residents, web publications, and newspaper articles. They also visited a number of Illinois institutions to photograph and complete preliminary inventories of artifacts previously collected from the forest preserves. All of the information collected was compiled and made available to PRI researchers involved in the master plan. For a complete list of organizations that contributed information see Appendix 1 (<http://hdl.handle.net/2142/55727>).

**ANALYSIS AND REPORT WRITING** Data generated during the field component was integrated with the data collected from other sources and analyzed by species-level and landscape-level experts. The plant ecologists conducted a site ranking and a prioritization of site and management needs. Specialists on amphibians and reptiles, birds, crayfish, and plants identified conservation priorities, particularly of threatened and

endangered species. Aquatic specialists modeled species richness and biotic integrity in streams and rivers. They prioritized aquatic areas for inventory and restoration.

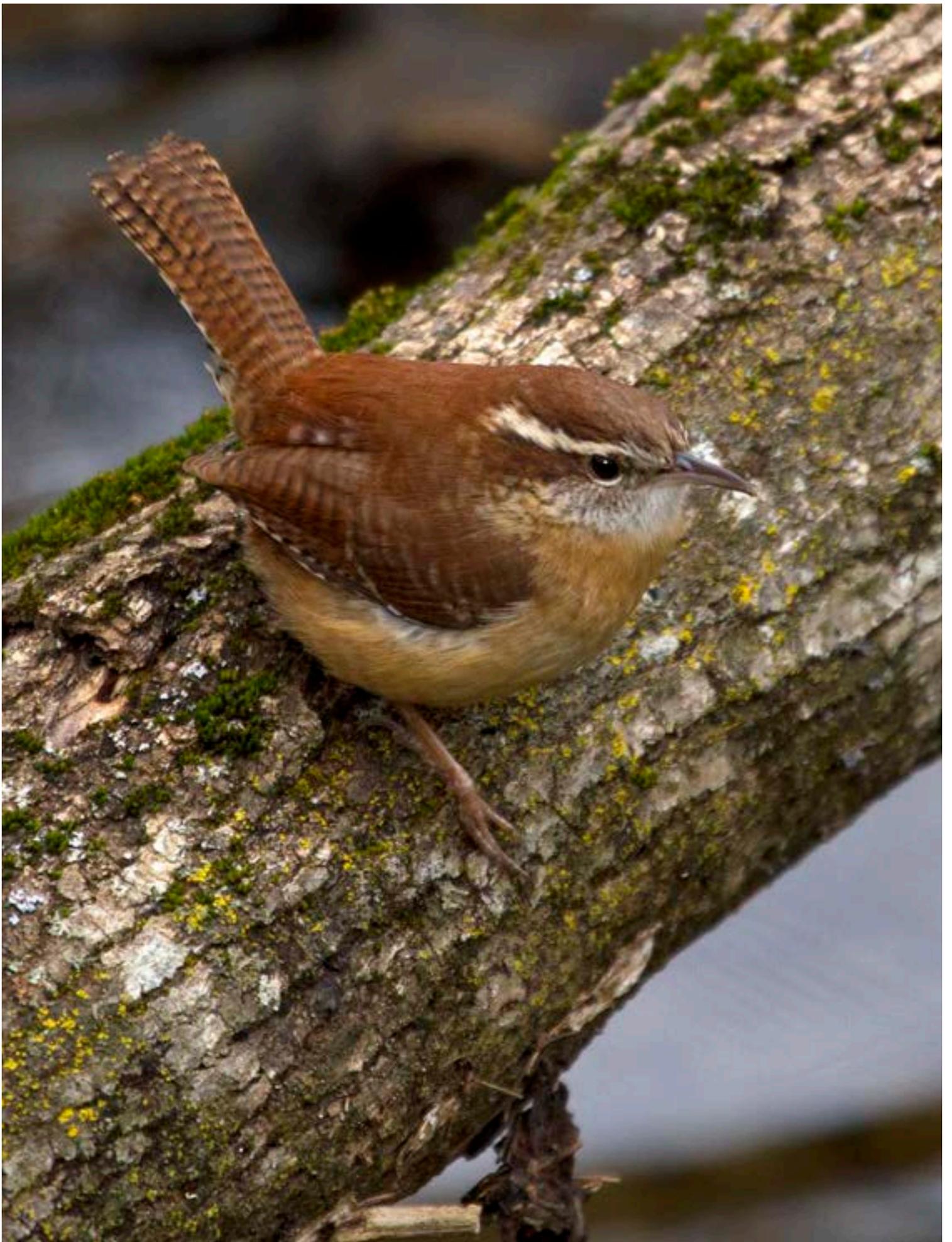
The Illinois State Water Survey assisted by identifying forest preserve flooding that has been documented by the Metropolitan Water Reclamation District. They also assessed several problem areas and identified causes and solutions. An archaeological field survey of the Forest Preserves' over 69,000 acres, and field evaluations of the FPCC's 550 known site areas, were not feasible within the time and budget constraints of this project. Instead, archaeologists developed models for evaluating archaeological site and landform significance and sensitivity in order to provide very general, but immediate, tools for cultural resource management. The human dimensions specialist conducted analyses to identify natural and cultural resource issues and barriers to effective resource management in the preserves. GIS specialists completed conservation design mapping.

This report was written by INHS, ISAS, and ISWS staff. Researchers wrote sections in their areas of expertise. Other sections were written by an ISWS staff writer, the coordinator, the INHS Acting Director, and the PRI Interim Executive Director. In addition to this report, the Forest Preserves will receive several technical reports written by PRI researchers; the information compiled from the sources listed in Appendix 1 (<http://hdl.handle.net/2142/55727>); and a Geographic Information System (GIS) integrating all the location-based information, including both electronic resources and some digitized paper-based records. These products will guide the Forest Preserves' natural and culture resource management as they implement the vision of the Next Century Conservation Plan.

## TOP TO BOTTOM

PRI PLANT ECOLOGIST ASSESSING HABITAT QUALITY AT THATCHER WOODS © C. BENDA

SITE EXCAVATION BY PRI ARCHAEOLOGIST © ISAS



SECTION

# 3

## Natural Resources of Cook County

The term *natural resources* usually applies to things that are not made by humans. It includes natural communities, such as prairies, savannas, woodlands, forests, wetlands, lakes, and streams; the non-living components of those communities, like the rocks, minerals, soils, water, and air; and the plant and animal species (but traditionally not people) that inhabit those communities. The great variety of species including mammals, birds, reptiles, amphibians, fish, crayfish, mussels, insects, other invertebrates, plants, fungi, and even bacteria and viruses are collectively often referred to as the earth's biological diversity, or *biodiversity* for short. The species that naturally occur in a region that were not brought in by people are referred to as native species. Species that come from other areas are exotic species. The Forest Preserves of Cook County has a goal to preserve the biodiversity native to Cook County. To do this the Forest Preserves staff must maintain native species, representative natural communities, and the genetic diversity of native plants and animals.

# Geography of Cook County

The geography of Cook County was shaped by glaciers. As the ice melted following the Wisconsin glaciation, some 10,000 years ago, the area close to present day Lake Michigan was covered by a shallow lake. This area, called the Chicago Lake Plain Section, is much flatter than the rest of the county (Figure 3.1). The area was easily developed and the city rapidly grew here before Jens Jensen, Daniel Burnham, and others developed the forest preserves concept. Very little undeveloped land remains in this part of the county.

The Chicago Lake Plain Section includes the valleys of both the Des Plaines and North Branch of the Chicago rivers. Many natural communities and protected natural areas occurring within upper drainage basins of the two river systems are similar to those elsewhere in northeastern Illinois. However, the southernmost portion of the Chicago Lake Plain Section is unique. The largest and highest quality representatives of lake plain wetlands, prairies, woodlands, and savannas occur on the old lake-bed and beach ridges. Burnham Prairie, Calumet City Prairie, Jurgensen Woods, Powderhorn Prairie, Sand Ridge, and Thornton-Lansing Road nature preserves are found here. Additional restorable remnants, either on forest preserve lands or adjacent to them, are found at Beaubien Woods, Dolton Avenue Prairie, Eggers Grove, Green Lake, Kickapoo Woods, Sand Ridge Nature Center, Superior Street Prairie, and Wentworth Woods. This region's extraordinary biological richness is also testified to by the numerous large native villages, cemeteries, and fortifications that were located here.

Behind the lake plain, the melting glaciers left behind debris forming north-south ridges that parallel the shoreline of the present day Lake Michigan. These debris piles are called *moraines*. Between the moraines, temporary lakes formed that later filled with sediment, leaving flat surfaces upon which appeared low sandy beach ridges and an occasional rocky

island. This region is called the Morainal Section. It is found in the northwestern and southwestern parts of Cook County and in a small area lying between the Des Plaines and North Chicago Rivers in north-central Cook County.

The portion of the Morainal Section encompassing northwestern Cook County is characterized by broad, flat to gently rolling expanses of what was historically a mosaic of prairies, savannas, and open woodlands, a landscape similar to that in the other counties surrounding Cook County. However, the Morainal Section covering southwestern Cook County is a landscape closely associated with the Chicago Lake Plain Section. The Chicago Outlet Valley (now the Cal-Sag Channel), where ancestral Lake Michigan

breached the Tinley and Valparaiso moraines and drained the Lake Plain, is bordered by the Cap Sauers and south Palos preserves on the south and the northern Palos Preserves on the opposite side of the Cal-Sag Channel. This area contains one of the largest and most varied forest blocks in northern Illinois, forming a vast complex large enough to provide habitat for declining wildlife species, protection for rare natural communities (fens, dolomite prairies, and woodlands), and a landscape experience of which the founders of the Forest Preserves of Cook County would have been proud.

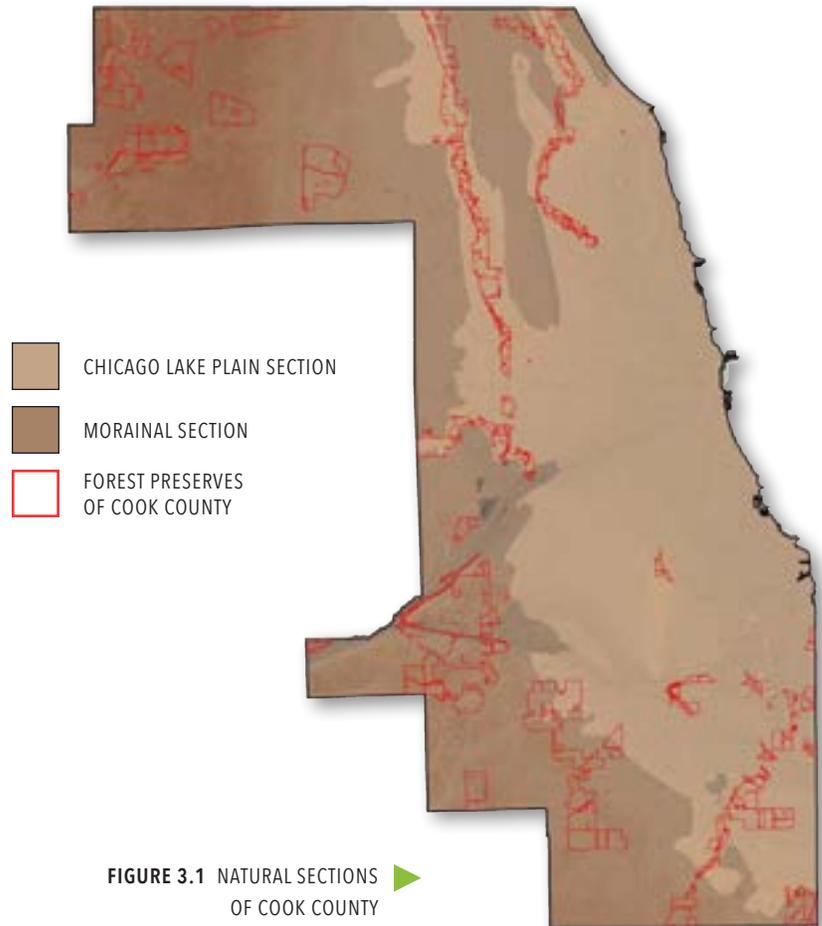


FIGURE 3.1 NATURAL SECTIONS OF COOK COUNTY



COOK COUNTY IS LOCATED IN THE  
**NORTHEASTERN MORAINAL DIVISION**  
OF ILLINOIS, WHICH INCLUDES THE CHICAGO  
LAKE PLAIN SECTION AND MORAINAL SECTION

# Natural Communities of Cook County

## PRESETTLEMENT NATURAL COMMUNITIES

When the first Europeans arrived in Cook County, they found a mosaic of prairie with scattered savanna (a mixture of prairie plants and scattered, fire-resistant oak trees), woodland, forest, and wetlands (Figure 3.2). Prairie covered about 73 percent of the region. Although the land and climate would have allowed forests to predominate, a long history of fire, mostly human in origin, favored grasslands. Forests, woodlands, and savanna covered about 20 percent of the land area, particularly where ravines, open water, or wetlands provided some protection from fire. Wetlands including marsh, slough, and wet prairie occupied 5.6 percent of the land area. Open water (lakes, ponds, and rivers) occupied 1.2 percent of the land area.

Although glaciation, climate, and fire have left a mark on modern day Cook County, human influences have had the greatest impact on natural spaces, which have dwindled since the days of the early explorers. Current estimates for land cover in Cook County indicate that 85 percent is developed land. Lands classified as forests rank second with 8.7 percent of the total land cover (53,484 acres). This includes an undetermined amount of residential and other developed lands with tree cover. About 57 percent of the wooded land cover occurs within the forest preserves. All other land cover types (e.g., open water, cropland, shrubland, pasture/hayfield, and grassland) make up 6.1 percent of the county with each totaling less than 2 percent of the land area.

**CURRENT NATURAL COMMUNITIES** Within the 945 square mile terrestrial land area of Cook County, nearly 50 different *natural communities* (assemblages of plant species co-existing under similar environmental conditions and natural processes) have been recognized, supporting approximately 1,200 species of native plants, just over half the statewide total.

Community classes are readily distinguished. In general, forest refers to wooded community types dominated by a wide variety of tree species where fire is not a primary factor in structuring the community. These stands typically occur in fire-protected locations, have canopy cover (the area covered by trees) exceeding 80 percent, and trees with ascending branches. Woodland and savanna refer to wooded communities generally dominated by oaks where past fires had a prominent role in structuring the community. Canopy cover ranges widely from about 10 to 90 percent and trees characteristically have more spreading branches than those in forest. Woodland and savanna communities also have a ground layer mainly made up of sun-loving native perennial plants.

Prairies are native grassland/forb communities dominated by herbaceous perennials with scattered low shrubs (e.g., leadplant, New Jersey tea, pasture rose). Most examples of prairie as well as the savanna subclass are highly fire-dependent. Wetlands include marsh, sedge meadow, seeps, and calcareous peatlands known as fens. Cultural is a community class reserved for developed lands and highly altered vegetation types (e.g., Eurasian meadow, cropland, unassociated woody growth, shrubland).

Among the recognized community categories mapped on forest preserve lands, cultural currently is the most dominant, with 27.6 percent of the land area, followed by "other woody" (combining unassociated woody growth, reforestation, and shrubland), with 26.4 percent of the land area. These two

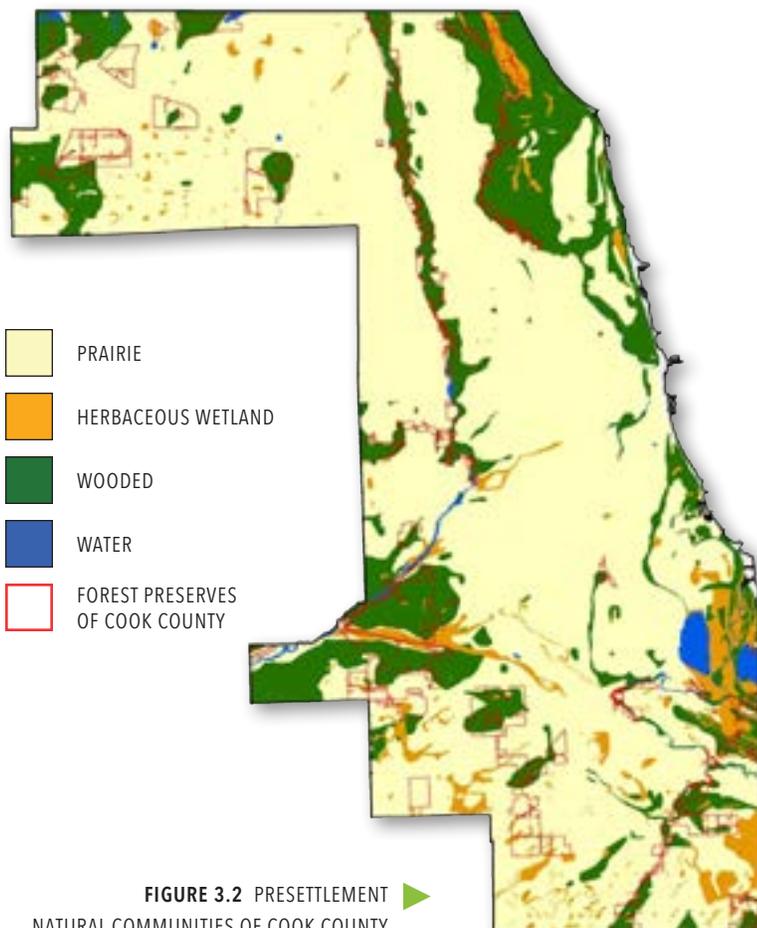
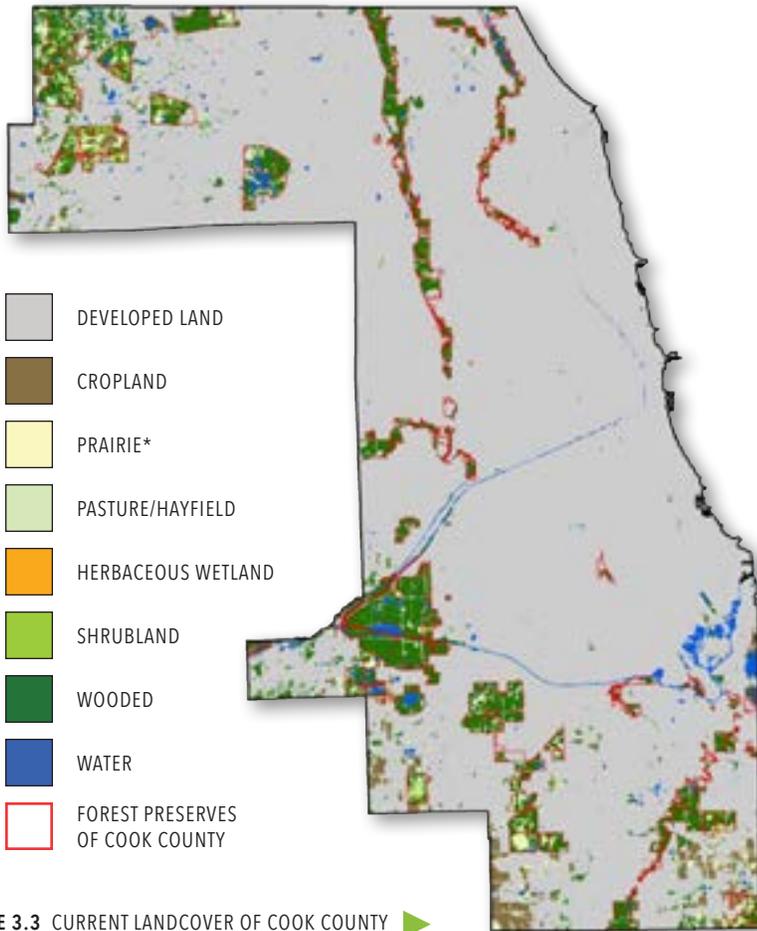


FIGURE 3.2 PRESETTLEMENT NATURAL COMMUNITIES OF COOK COUNTY



**FIGURE 3.3** CURRENT LANDCOVER OF COOK COUNTY (\* MAY INCLUDE OTHER GRASSLAND TYPES)

categories, unrepresentative of natural communities, total 54 percent of forest preserve lands. Woodland is the most prominent natural community class with about 24 percent of the land area followed by wetland (combining marsh, sedge meadow, seep, and fen) with 10 percent. Forest community types total 8 percent of the FPCC lands. When combined with woodland and savanna, wooded natural communities total 33.5 percent of the land area. Prairie totals 2.4 percent of the land area. The combined acreages of wooded natural communities (forest, woodland, and savanna), wetlands, and prairie total 46 percent of the FPCC land area and support the vast majority of native biodiversity. Habitat reconstruction will be necessary to reclaim portions of the 54 percent of developed and highly altered lands in the preserve system and to meet FPCC goals for future land cover.

**UNIQUE AND CHARACTERISTIC NATURAL COMMUNITIES** Several plant communities in the forest preserves system are unique in Illinois or are primarily limited to Cook County. Particularly notable are sand flatwoods, northern flatwoods, local inclusions of wet-mesic upland forest (locally termed open vernal wetlands or upland morainal depressions), and mesic gravel prairie. Signature characteristics of remnant wooded communities in the region and the forest preserves are oak woodlands and savannas. The Palos and Sag Valley divisions form a notably large, heterogeneous complex of preserves totaling 15,524 acres. This area supports woodlands with local wetland habitats such as graminoid fens. It provides opportunities to establish ecological linkages to enhance habitat recovery potential.

Dolomite prairies in the Southwest Zone, gravel prairies in the South and Northwest zones, and shrub prairies in the South Zone are rare natural communities statewide that provide additional distinction to the preserve system; examples also are found outside Cook County. Also distinctive are prairies on silt loam and sandy soils, which formerly were dominant in Cook County. Some of these are the focus of planned restoration; existing remnants provide templates for habitat reconstruction.

**HIGH-QUALITY NATURAL COMMUNITIES**

The Illinois Natural Areas Inventory (INAI) includes a list of tracts of land that support high-quality examples of the different natural community types. Their quality is determined by a grading system that considers the current makeup of the native plant community; the amount of disturbance the site has experienced from plowing, logging, excessive flooding, or invasion by exotic species; and whether natural ecological forces like periodic fire or natural water flow continue to function.

Areas determined to support “high quality natural communities” are called “INAI Natural Areas” and receive legal protections under Illinois law. If a natural community is not considered high quality it is sometimes referred to as *degraded*. Lands that are not high enough quality to become INAI Natural Areas can be managed to improve their quality. This process is called natural community restoration. The Forest Preserves have been actively restoring natural communities for many years, using staff, contractors, volunteers, and partner organizations. The recent statewide update of the INAI identified two sites as newly qualifying for the INAI. Neither site had qualified for the original INAI in the 1970s but both had been restored by FPCC staff and volunteers to high Natural Area quality.

About 36 acres of high-quality forest habitat, mostly wet-mesic floodplain forest, have been identified in Cook County by the INAI. A total of 111 acres of high-quality woodland and savanna habitat, mostly dry-mesic sand savanna, have been identified; high-quality prairie totals 232 acres. High-quality wetland



habitats total 195 acres, predominantly sedge meadow, graminoid fen, and seep communities. About 81 additional acres of forest, woodland, and savanna are under review for inclusion in the INAI.

Taken together, nearly 700 acres in Cook County, predominantly on FPCC lands, currently meet the INAI criteria for high-quality habitats. In addition, assessments by the PRI plant ecologists have identified about 4,300 acres of FPCC lands that have high potential for restoration. However, in a county with one of the highest human population densities in the United States, many of these natural features are at risk.

Maintaining this rich biodiversity will require vigilant commitment to habitat management, recovery, and restoration. Ongoing and coordinated ecological monitoring will be a cornerstone practice for adaptive management and conservation planning. The Forest Preserves of Cook County have in place the conservation framework to carry out these measures.

▲  
 DRY GRAVEL PRAIRIE AT  
 SPRING CREEK PRAIRIE © C. BENDA

## Potential Natural Community Goals for the Forest Preserves

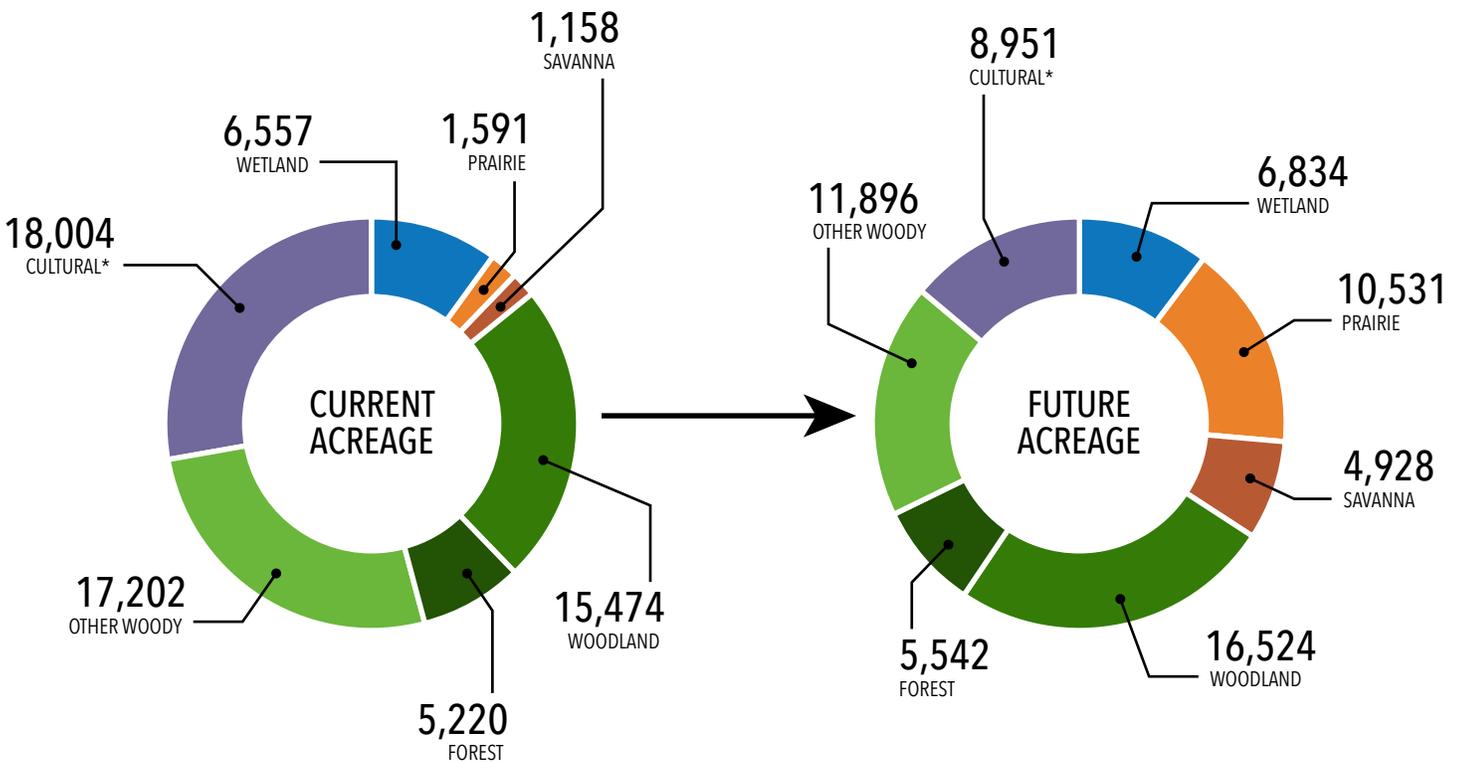
In 2008, Forest Preserve staff developed a long-range vision for natural community restoration on all the preserves. Achieving that vision would require reducing cultural community types by about 50 percent by eliminating cropland and reducing Eurasian meadow by about 80 percent (Figure 3.4). In addition, "other woody" would have to be reduced by about 31 percent, primarily by reducing acreage of unassociated woody growth. Under this scenario, woodland would increase by 6.8 percent, wetland by 4.2 percent, and forest by 6.2 percent. In contrast to these small changes, acreage of prairie would increase by 562 percent and savanna by 326 percent.

Converting the large area of cultural community types to sustainable restored savanna, woodland, forest, prairie, and wetland will require a tremendous investment of money and effort and will not happen quickly. Achieving the short-term goal of the Next Century Conservation Plan of restoring 30,000 acres to Illinois Natural Areas Inventory quality will require focusing first on restoring degraded natural communities and later on conversions of cultural communities. Priorities for restoration are discussed in more detail in Section 7, *Integrative Resource Management*.

Restoration and reconstruction are most effective when environmental conditions are suitable for the projected goals. For example, prairie reconstruction usually is more successful on soils with low nutrient availability. Estimated early settlement vegetation boundaries provide a practical ecological outline for matching community type goals to a site, and existing natural areas provide vital benchmarks to guide restoration.

**FIGURE 3.4** CURRENT AND FUTURE ACREAGE OF FPCC LAND BY COMMUNITY TYPE

\*DEVELOPED LAND, HIGHLY ALTERED VEGETATION, AND CROPLAND



# Species at Risk in Cook County

Some species are considered *endangered* or *threatened*. These species are in danger of being lost or *extirpated* (wiped out) from a region. If they are lost from everywhere on the planet they are considered *extinct*. The Passenger Pigeon is an example of an Illinois species that became extinct 100 years ago, coincidentally the same year the Forest Preserves of Cook County was established.

Threatened and endangered (T&E) species are legally protected and receive special attention from the Forest Preserves. At one point in time a total of 184 federally or state-protected threatened and endangered species were reported from Cook County, the greatest

number for any Illinois county except perhaps Lake. As of now, we estimate as many as 69 of these have been extirpated from Cook County, leaving at least 115 T&E species still present in the county. Other species have been identified that are in less danger, but still worthy of conservation consideration. The Illinois Comprehensive Wildlife Action Plan and Strategy, developed by the Illinois Department of Natural Resources, identified another 89 animal species in Cook County as "Species in Greatest Need of Conservation." An additional 713 species in the county are categorized as "of Conservation Concern" by Chicago Wilderness. A list of these species at risk appears in Appendix 2 (<http://hdl.handle.net/2142/55728>).

The FPCC holdings are critical habitat for these species at risk. Historically, 151 federally or state-protected T&E species were known from the preserves, of which over 100 are believed still to be present. This represents almost 90% of the T&E species still found in Cook County. In addition, 69 Species in Greatest Need of Conservation and 554 Chicago Wilderness Species of Conservation Concern are found on the forest preserves, 78% of Cook County's species in both of these categories. Many of these T&E and other species at risk persist in the county only on the forest preserves.

PASSENGER PIGEON SPECIMEN © M. JEFFORDS

#### CLOCKWISE FROM TOP

STARHEAD TOPMINNOW © P. NIXON

LEAST BITTERN © M.K. RUBEY

FOUR-TOED SALAMANDER © D. RUFFATTO

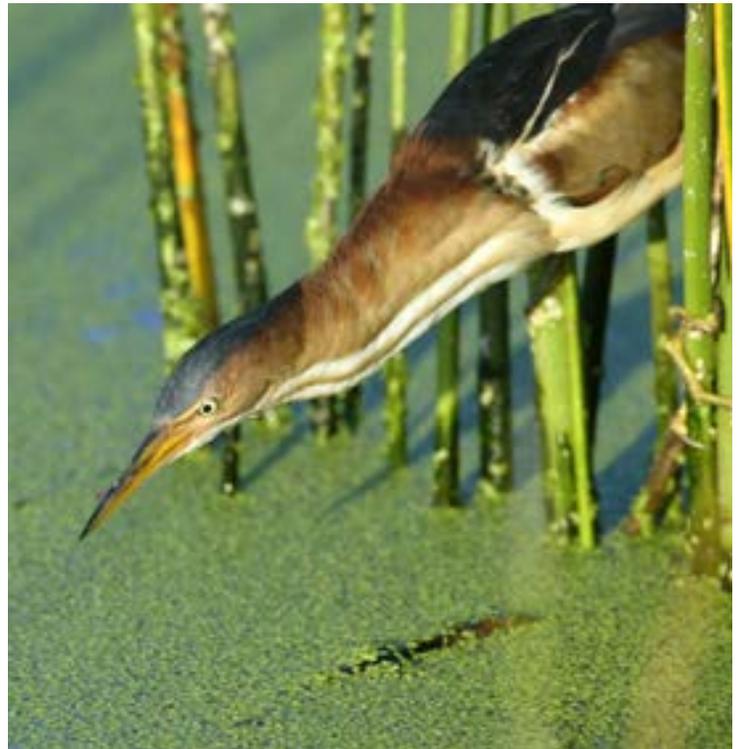
SPOTTED CORAL-ROOT © P. MARCUM

## THE PASSENGER PIGEON BECAME EXTINCT 100 YEARS AGO





184 T&E SPECIES  
HAVE BEEN REPORTED FROM COOK COUNTY





# 135 ILLINOIS T&E PLANTS

HAVE BEEN REPORTED FROM COOK COUNTY



## Plants in Cook County

More plant species have been reported from Cook County than any other Illinois county. This is attributable in part to the large size of the county (not including Lake Michigan acreage, Cook County ranks 5th of 102 Illinois counties in total land area) and in part to the presence of a wide variety of habitat types. Natural communities originally found in these habitats included a great variety of habitats from calcareous prairies to acid peatlands, from sand savannas on the lake plain to woodlands on glacial moraines, and from lakeshore beach and dune habitats to floodplain forests along major streams.

However, Cook County also has one of the highest human population densities in the United States. Development and other human activities have degraded or destroyed natural communities and reduced or eliminated populations of many plant species.

A total of 135 plant species listed by the Illinois Endangered Species Protection Board as threatened or endangered have been reported from Cook County, more than any other Illinois county (Appendix 2; <http://hdl.handle.net/2142/55728>). These include four species also listed by the U.S. Fish and Wildlife Service as threatened or endangered. Conservation populations of two other federally listed plant species known from northeastern Illinois also have been established in Cook County. Five threatened or endangered species are known in Illinois only from Cook County, making their preservation especially important.

Of these 135 threatened or endangered plant species, 55 (41 percent) appear to have been extirpated (lost) from Cook County. Wetland species (plants known to occur regularly in wetlands) appear to have been particularly vulnerable. They make up 53 percent of the county's threatened and endangered species and 59 percent of the extirpated species. Cook County also was the former home to 27 species considered extirpated from Illinois, including the enigmatic thismia, a species formerly known only from Cook County and now probably extinct. An additional six species reported from Illinois based on written records for Cook County may also be among the extirpated species; however, no specimens have been found to confirm them as members of the flora.

◀ **CLOCKWISE FROM TOP LEFT**  
 GRASS PINK ORCHID © P. MARCUM  
 SLENDER SANDWORT © J. TAFT  
 LITTLE GREEN SEDGE © J. TAFT  
 BUNCHBERRY © C. CARROLL-CUNNINGHAM

**LEFT TO RIGHT**  
 PITCHER PLANT © P. MARCUM  
 PINK MILKWORT © J. TAFT  
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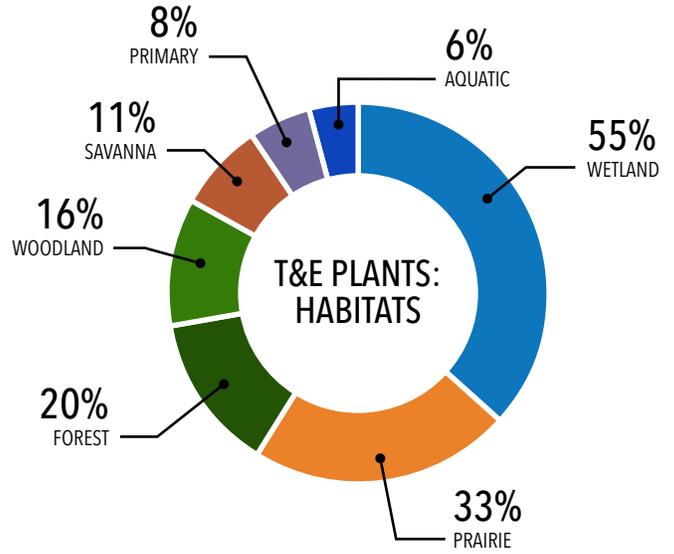
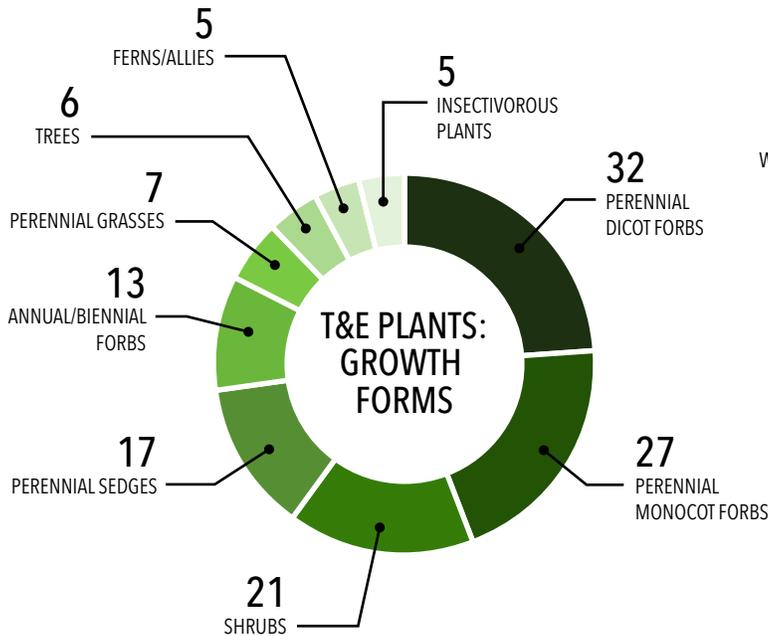
**41% OF ILLINOIS T&E PLANTS**  
 HISTORICALLY REPORTED FROM COOK COUNTY  
 HAVE BEEN EXTIRPATED FROM THE COUNTY



27 NATIVE PLANTS  
FORMERLY FOUND IN COOK COUNTY HAVE  
BEEN EXTIRPATED FROM THE STATE



**FIGURE 3.5** NUMBER OF THREATENED AND ENDANGERED PLANT SPECIES WITHIN EACH GROWTH FORM CLASSIFICATION



**FIGURE 3.6** PERCENT OF THREATENED AND ENDANGERED PLANT SPECIES FOUND IN EACH HABITAT TYPE

**DISTRIBUTION IN THE FOREST PRESERVES** A total of 118 threatened or endangered plant species have been recorded at least historically from 29 Cook County forest preserves with extant (persistent) populations reported from 24 sites. Many of these preserves support multiple threatened or endangered plant species, making them among the richest locations for rare plants in the state.

**ABOUT THE SPECIES** Threatened and endangered species reported from Cook County come from a wide range of plant growth forms and plant families (Figure 3.5). Most are perennial forbs, including dicot and monocot species. Plant families with the greatest number of threatened and endangered species in Cook County are the sedges (Cyperaceae) with 17 species, orchids (Orchidaceae) with 13 species, and composites (Asteraceae) and grasses (Poaceae), each with 7 species.

About 76 percent of the threatened and endangered species that occur in Cook County are present here at the margins of their geographic distributions, where species tend to be found in low abundance; about 60 percent are at the southern limit of their midwestern ranges. All but a few of these are widespread species from throughout northern or northeastern regions of North America. Few of the rare plant species in Cook County have primarily southern or western geographic distributions. Increased climatic warming likely will pose additional stresses on many species. Northern species at their southern limits in Cook County may already occur

outside their optimal climate setting. To maintain species diversity, conservation planning needs to address the capacity for plants to adjust to shifts in their optimal ranges.

Most threatened and endangered species occur in wetlands followed by prairies, forests, and woodlands (Figure 3.6). Some species occur in more than one community class; comparatively fewer species occur in savanna, primary (e.g., bedrock, shoreline), or aquatic habitats. Among wetland habitats, the greatest number of threatened and endangered species (40) occur on moist sandy soils in a variety of specific habitat types (e.g., wet to wet-mesic sand prairie, sand seep, sand flatwoods, beach, panne, and areas of excavated sand). Numerous additional species occur in peatlands, specifically fens (29) or bog and bog-like habitats (28). Peatland habitats might be particularly at risk with climate change if conditions for peat-formation and maintenance are altered.

**CLOCKWISE FROM TOP**  
 WINTERGREEN © J. TAFT  
 THISMIA © P. MARCUM  
 BLUEBEAD © J. TAFT  
 TWINFLOWER © J. TAFT



# WOODY ENCROACHMENT IS THE BIGGEST THREAT TO ILLINOIS T&E SPECIES IN COOK COUNTY

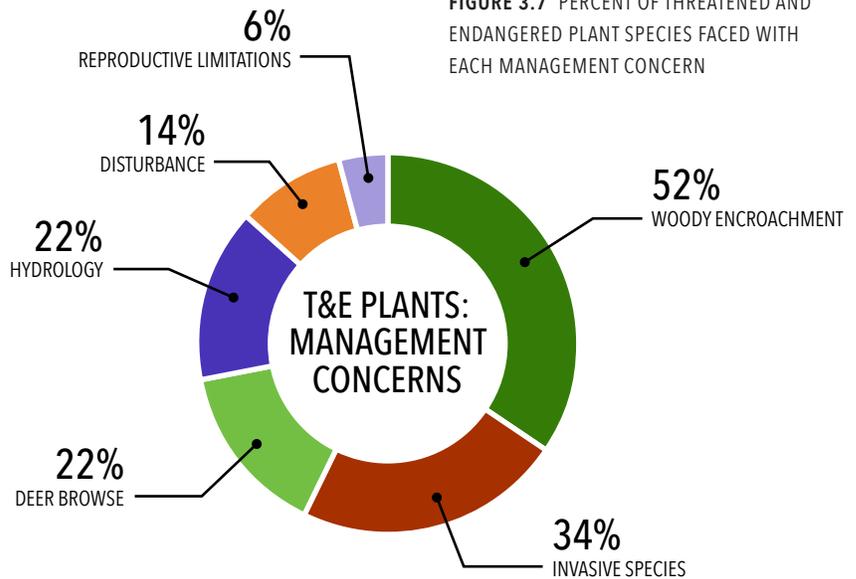
### THREATS AND MANAGEMENT CONCERNS

Seventy-four percent of threatened and endangered species known from Cook County were identified as having at least one management concern and 44 percent have multiple management concerns. Woody encroachment (fire-intolerant shrubs and trees spreading into prairies and savannas) resulting from insufficient management with prescribed fire is the single greatest threat, recorded for 52 percent of species (Figure 3.7). Competition from invasive species is specifically a management concern for 34 percent of species, although far greater numbers could potentially be impacted by invasive species. Threats from animal browsing, primarily white-tailed deer, were identified for 22 percent of species; 22 percent of species also were recognized as having management concerns related to altered water resources. Six species (4.5 percent) were identified with known reproduction challenges, including self-incompatibility and/or pollinator limitations, but this may be an underestimate. Disruption of timing of flowering and pollinator activity by climate change, which has been observed

elsewhere, could lead to reproductive failure for some plant species.

Fourteen percent of species were identified as being particularly sensitive

**FIGURE 3.7** PERCENT OF THREATENED AND ENDANGERED PLANT SPECIES FACED WITH EACH MANAGEMENT CONCERN



to disturbance. For example, many aquatic or wetland species are intolerant of reduced water quality (pollution or siltation). Some species of sand dunes or beaches require a certain level of



disturbance to limit competition but are at risk when disturbance is too great. One species associated with cliff habitat could be prone to disturbance from climbing activities and another may be threatened by trailside trampling.

A developing management concern is global climate change. Optimal climate for many plant species is expected to shift northward. Although assisted migration (intentional movement of plants) might be considered in some cases, site restoration and management remains the frontline for conserving biodiversity at the local scale.

Additional contributing factors for rarity among threatened and endangered plant species in Cook County and the forest preserves include limited habitat (naturally infrequent or small total area), species that are naturally scarce (typically occur infrequently and in small population sizes), and species distant from their primary ranges. Exploitation and collecting is a concern for many species, particularly orchids. Overlay these factors with extensive habitat loss

and degradation and it is no surprise that so many plant species are threatened or endangered in Cook County.

**MONITORING PROGRAMS** The Chicago Botanic Garden coordinates a program of population monitoring for species of conservation concern, including many threatened and endangered species. Most species with adequate monitoring data (minimum of 5 years) show no significant changes in their populations. However, significant declines were identified for 14 populations among 9 species, and significant increases were identified for 15 populations among 12 species. Forest Preserve staff also monitors plant species of conservation concern and adjusts their management efforts when they see deleterious changes in the habitat. Continued monitoring is required to minimize the chance that populations or entire species are lost from Cook County and the forest preserves.

▲  
**LEFT TO RIGHT**  
 DOGWOOD ENCROACHMENT © C. BENDA  
 PURPLE FRINGED ORCHID © C. BENDA  
 INDIAN CUCUMBER-ROOT © J. TAFT  
 ROYAL CATCHFLY © J. TAFT



# 16 AMPHIBIANS AND REPTILES

ARE OF CONSERVATION CONCERN IN COOK COUNTY FOREST PRESERVES

## Amphibians and Reptiles in Cook County

The first list of amphibians and reptiles for Cook County, and indeed for any part of Illinois, was compiled by Robert Kennicott in 1855. Many additional lists have been prepared since then, the most recent being Tom Anton's "Current Distribution and Status of Amphibians and Reptiles in Cook County, Illinois," published in 1999. Anton's publication and subsequent report to the FPCC included all of Cook County, but field surveys were conducted at 80 forest preserves over three field seasons (1995–1997). This remains the most authoritative account of the amphibians and reptiles on the FPCC holdings to date.

Anton identified the historical number of species in Cook County as 18 amphibians and 28 reptiles. Of these, he documented 13 species of amphibians and 19 species of reptiles in the forest preserves, but stressed the possibility that other species known from Cook County may be found in future surveys of FPCC holdings. Anton's publication and unpublished report were used as the basis of this report, but all original museum and photo records were double-checked and records subsequent to Anton's reports were added.

Of the 32 species known from the forest preserves, exactly half appear to be doing relatively well. This section focuses on the 16 species that are of conservation concern, specifically those that are listed as endangered or threatened by the Illinois Endangered Species Preservation Act, as Species in Greatest Need of Conservation in the Illinois Comprehensive Wildlife Action Plan and Strategy, or as Chicago Wilderness Species of Conservation Concern (see Appendix 2; <http://hdl.handle.net/2142/55728>).

**SPECIES EXTIRPATED FROM THE FOREST PRESERVES** The eastern hog-nosed snake, four-toed salamander, massasauga, six-lined racerunner, slender glass lizard, spotted turtle, and western ribbonsnake are likely no longer found in Cook County. Of these, only the massasauga was historically known to be widespread in Cook County, including on FPCC preserves. The Eastern Massasauga Recovery Plan and agreements between the FPCC, the U.S. Fish & Wildlife Service, and the Illinois Department of Natural Resources will direct conservation measures for this species. There is a captive breeding program for the massasauga, and both the Lincoln Park Zoo and the Brookfield Zoo are partners. Because the other six of these species were never a major part of the fauna of Cook County, it is questionable whether resources should be directed toward their conservation. The slender glass lizard may still be found in the forest preserves and may even be encountered in future surveys, but numbers of individuals are likely so low that extreme intervention would be required to establish viable populations.

Two species, the eastern box turtle and the mudpuppy, appear to no longer occur on the forest preserves although they may still be found elsewhere in Cook County. Establishing the status of the eastern box turtle is problematic because of the difficulty in distinguishing among native populations and released pets. Nevertheless, so few individuals have been encountered in or near FPCC preserves that resources are best directed at other species. The mudpuppy is known from recent Cook County records and viable populations remain, but not on FPCC preserves. In addition, there is likely no suitable habitat available on FPCC sites.

**TOP TO BOTTOM**  
FOUR-TOED SALAMANDER © J. MUI  
WESTERN RIBBONSNAKE © M. DRESLIK



**SPECIES FOR MANAGEMENT** The remaining seven species, Blanchard’s cricket frog, Blanding’s turtle, blue-spotted salamander, Graham’s crayfish snake, Kirtland’s snake, smooth greensnake, and wood frog, historically had wide distributions and/or more than a few records, including some recent records from FPCC preserves. Monitoring should be continued for these species, particularly at recent and historical locations and also at preserves with suitable habitat. These species can be grouped into categories based on similarity of habitat and management needs.

The blue-spotted salamander and wood frog require fishless ponds for reproduction and closed canopy woodlands for adult habitat. Management for these species includes preventing introduction of predatory fish into small, woodland ponds and perhaps removal of fish from appropriate ponds.

The Graham’s crayfish snake, Kirtland’s snake, and smooth greensnake are grassland snakes that inhabit wet prairie or open canopy bodies of water. The first two also depend on crayfish for food or shelter. In addition to maintaining or restoring water resources for crayfish, management activities should include restricting prescribed burns and mowing to periods when snakes are inactive, generally November through mid-March in Cook County.

The remaining two species, Blanchard’s cricket frog and Blanding’s turtle, both rely on wetlands. Blanding’s turtle depends on a mosaic of wetlands interspersed with grassland or savanna. Management should focus on connecting appropriate wetlands with habitat corridors. Blanchard’s cricket frog has experienced drastic declines throughout the northern portion of its range, including Cook County. The reasons for the decline of this once widespread

species are not fully understood so it is difficult to suggest management options. Populations on FPCC sites have disappeared in the absence of any obvious habitat destruction or degradation. Current populations exist in Will County immediately adjacent to the FPCC preserves, so reintroduction is a viable option.

**LEFT TO RIGHT**

WOOD FROG © M. JEFFORDS  
 BLUE-SPOTTED SALAMANDER © M. JEFFORDS

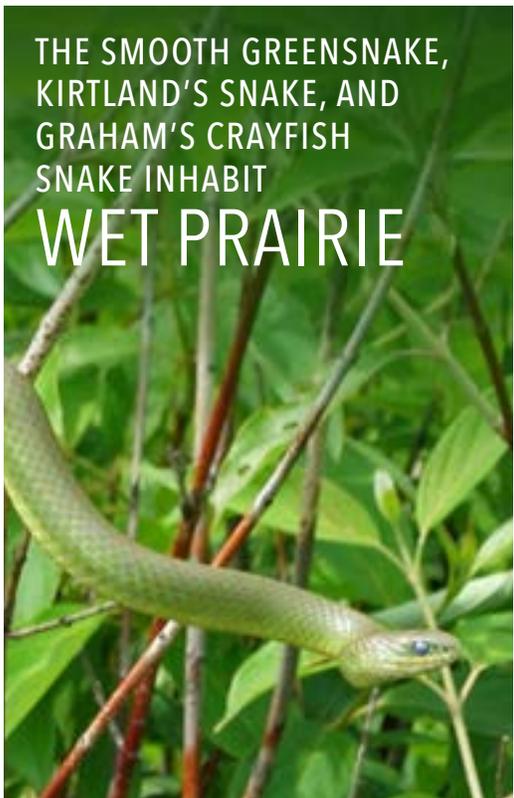
**CLOCKWISE FROM TOP LEFT**

SMOOTH GREENSNAKE © J. MUI  
 KIRTLAND’S SNAKE © M. JEFFORDS  
 GRAHAM’S CRAYFISH SNAKE © M. DRESLIK  
 BLANCHARD’S CRICKET FROG © J. MUI  
 BLANDING’S TURTLE © C. BENDA



THE WOOD FROG AND  
 BLUE-SPOTTED SALAMANDER NEED  
**FISHLESS PONDS &  
 CLOSED CANOPY WOODLANDS**

THE SMOOTH GREENSNAKE,  
KIRTLAND'S SNAKE, AND  
GRAHAM'S CRAYFISH  
SNAKE INHABIT  
**WET PRAIRIE**



THE BLANDING'S TURTLE  
AND BLANCHARD'S CRICKET  
FROG RELY ON  
**WETLANDS**



## Birds of Cook County

Given its juxtaposition between breeding areas for northern and southern species and proximity to a major migration corridor along Lake Michigan, Cook County is positioned to experience an impressive diversity of breeding and nonbreeding birds. Indeed, 332 species of birds have been recorded for the county. These species include 25 of 30 that are currently listed as threatened or endangered in Illinois, 78 species that are listed as Species in Greatest Need of Conservation in the Illinois Comprehensive Wildlife Action Plan and Strategy, and 99 species that are listed as Chicago Wilderness Species of Conservation Concern (see Appendix 2; <http://hdl.handle.net/2142/55728>).

The approximately 70,000 acres managed by the FPCC provide ample opportunities to attract a diverse community of bird species. Despite accounting for about 11 percent of the land area of Cook County, about half of the 340,000 bird records for the county, mainly collected by the Bird Conservation Network (BCN), have come from FPCC sites, including reports of 279 species, 20 of which are state threatened or endangered, and 68 of which are listed as Species in Greatest Need of Conservation. Moreover, 34 percent of records for state threatened and endangered species and about 60 percent of records for both Species in Greatest Need of Conservation and Chicago Wilderness Species of Conservation Concern have been reported from the forest preserves. Even more strikingly, 80 percent of records for Species in Greatest Need of Conservation and for Chicago Wilderness Species of Conservation Concern, and nearly half of records for state threatened and endangered species that were reported

during the breeding season were from FPCC sites. Collectively, these results suggest that natural areas managed by the Forest Preserves of Cook County are of vital importance for bird conservation.

### ABOUT CONSERVATION PRIORITY SPECIES

Species of conservation priority generally are habitat specialists and are found only in one or a few plant community types. Importantly, forest preserves in Cook County are providing a habitat for priority species across a range of habitat conditions. For example, wetlands on these sites provide breeding habitat for numerous state threatened and endangered species such as black-crowned night herons, American bitterns, common gallinules, yellow-headed blackbirds, and least bitterns. Grassland areas provide breeding and winter habitat for northern harriers, a state endangered species, and numerous other species of concern, including bobolinks, Henslow's sparrows, and grasshopper sparrows.



BIRD SPECIES OF  
CONSERVATION PRIORITY ARE GENERALLY  
**HABITAT SPECIALISTS**



Early successional woody habitats provide a critical habitat for the state-threatened black-billed cuckoo and other species of concern such as the field sparrow, willow flycatcher, and brown thrasher. Wooded habitats, including forests, savannas, and open woodlands, provide habitat for conservation-priority species such as northern flicker, red-headed woodpecker, wood thrush, and yellow-billed cuckoo. Moreover, many areas are providing non-breeding habitat for neotropical migrant land birds, including during migration. Overall, 30 percent of non-breeding records were for these neotropical migrants, and 32 percent of those records came from forest preserves sites. Some have suggested that forested river corridors along the Des Plaines River and the North Branch of the Chicago River provide a particularly critical habitat for these migrants, but forest preserves along these rivers account for only 9 percent of the total observations of neotropical migrant land birds during the non-breeding season.

Despite the habitat specificity of most priority birds, and species of concern in particular, species that require different habitats are not found in different FPCC sites. Indeed, priority species that are dependent on wetlands, grasslands, shrublands, and forests may be found at the same site. Although this may be popular with birders because they can maximize the number of species seen on any given trip, this may not be the best situation for the birds themselves.

In particular, certain species may only be found in especially large tracts of a particular habitat. The existence of this phenomenon, termed area sensitivity, may mean that in some cases prioritizing one or two habitat types at some sites may be a preferable approach. For example, prioritizing large grasslands may increase the probability of attracting northern harriers, short-eared owls, and upland sandpipers, all state-endangered species in Illinois. Large forest tracts promote successful breeding of many species. For this reason, when possible, priority should be given to creating or restoring large tracts within the forest preserves.

**LEFT TO RIGHT**

BLACK-CROWNED NIGHT HERONS © M. JEFFORDS

BOBOLINK © M. JEFFORDS

BLACK-BILLED CUCKOO © G. SPYREAS

WOOD THRUSH © M. JEFFORDS





67 FISH SPECIES

HAVE BEEN ENCOUNTERED IN COOK COUNTY STREAMS SINCE 1995

## Aquatic Species in Cook County

Cook County contains 10,200 acres of lakes and ponds (not including Lake Michigan), 2,300 acres of swamps and marshes, and 576 miles of creeks and rivers. Included among its major rivers are the Chicago, the Des Plaines, and Calumet. Over the past two centuries, humans have modified existing waters and engineered new ones, forming canals, ditches, and reservoirs. Ninety-five fish species have been recorded in the county, not including those from Lake Michigan and hybrids (INHS fish database). Sixty-seven fish species were observed at least once in Cook County's streams between 1995 and 2013 in Illinois Department of Natural Resources (IDNR) basin-intensive surveys.

The most widespread species included green sunfish, bluegill, white sucker, largemouth bass, and common carp. These species are tolerant of a wide range of conditions. Other species showed more particular habitat preferences. Northern pike, black crappie, and spotted suckers were usually encountered in large streams and small rivers (stream orders 3–5), while grass pickerel, common shiners, and creek chub were more common in headwaters and small streams. Additional sport fish that were regularly observed included channel catfish, smallmouth bass, and walleye. Two fish species listed as threatened by the State of Illinois, the banded killifish and the Iowa darter, are found in the county.

Twenty-nine mussel and clam species have been recorded in the county (not including Lake Michigan), including three exotic invasive ones: the zebra mussel, Asian clam, and mottled fingernail clam. INHS mussel surveys on the county's streams between 2010 and 2013 produced 11 species, all of them native. Two mussel species listed as threatened by the State of Illinois, the slippershell and the black sandshell, were included.

Managing to protect these rare species encourages diverse and productive ecological communities that are more resilient to invasive species, climate change, and water quality issues. For instance, native freshwater mussels provide food for sport fish; in congregations they serve as habitat for bottom-dwelling fish and insects; and they even help to improve water quality by filtering out particles and nutrients.

Cook County's waterways have long borne the burden of being within a major urban and industrial region. Pollution, fragmentation from dams and levees, altered water flow from stormwater runoff, and invasive species have all dramatically affected native aquatic species. (These threats are discussed in more detail in Section 5, *Natural and Cultural Resources Threats and Needs*.) In waters that a century earlier had hosted diverse and abundant fish and mussels, surveys in the early to mid-1900s downstream of Chicago turned up only a handful of highly tolerant species like black bullhead and bluegill. Since then there have been significant improvements in water quality, largely linked to advancing methods of "wastewater treatment."

In response, the total number of fish species observed by the Metropolitan Water Reclamation District (MWRD) in the Chicago and Calumet River systems has increased from 32 in 1974–1977 to 54 by 1990. In September of 2014, IDNR scientists surveying Chicago's North Shore Channel recorded the county's first ever spotted gar, a species that requires clear, vegetated waters. Some mussels have also begun to recolonize.

Recent decades have witnessed a commitment to improve Cook County's water quality and restore its aquatic plants and animals. To facilitate science-based conservation of aquatic systems by the FPCC, PRI scientists (1) compiled available data on Cook County's freshwaters, particularly their fish, mussels, and water quality; (2) analyzed these data to better understand the distribution of Cook County's aquatic resources; and (3) developed recommendations for effective conservation action.

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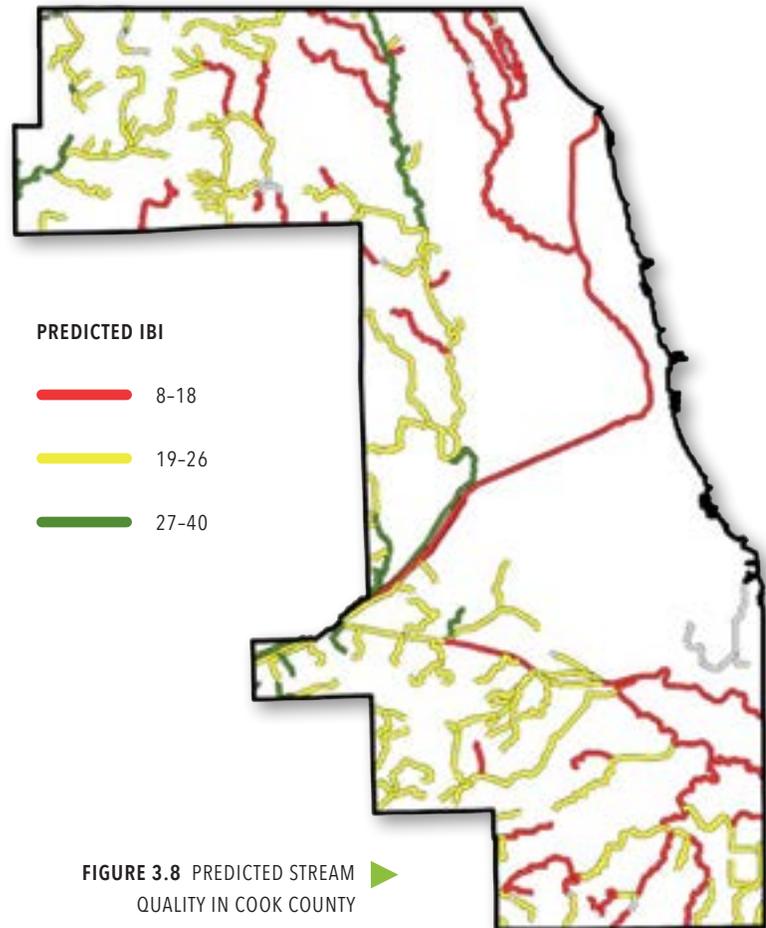
GREEN SUNFISH © P. NIXON

BLUEGILL © P. NIXON

**STREAMS AND RIVERS** Streams and rivers form connected networks. Many animal species take advantage of this connectedness by moving among different habitats to complete their lifecycles—a place to feed, a place to hide, a place to spawn. In freshwater conservation, it is therefore important to protect a diversity of habitats from small headwaters to large rivers, and to maintain the connections among them. This variety of habitats also ensures that a variety of species with different habitat requirements are protected.

It is also important to consider the connections among stream and river reaches (segments of streams or rivers) that allow aquatic species to disperse to new sites. It is useful to consider a reach's neighborhood, the set of all reaches that, when traveling along waterways, are nearby. Conservation plans can prioritize two complementary actions: protecting good reaches in poor quality neighborhoods (dispersal sources) and restoring poor quality reaches in good quality neighborhoods (destinations).

Although aquatic fauna in Cook County have been monitored for a long time, only a small proportion of reaches have been sampled. To estimate the conservation values or restoration potentials of unsampled reaches, PRI researchers examined information for the greater Chicago region obtained through basin-intensive surveys conducted by the IDNR and the Illinois Environmental Protection Agency. High-quality sites throughout the region should share characteristics of stream size, flow, geology, climate, and riparian and watershed land use. Thus sites in Cook County that are similar to high-quality sites elsewhere in the region probably are also of high quality. We assessed three indicators of stream biological conditions: the number of fish species, the number of mussel species, and an index of biotic integrity (IBI) based on the fish community. IBI scores are designed to measure how similar a reach's fish community and, more broadly, its biological conditions, are to reaches that are relatively unaffected by humans but otherwise comparable in natural environment.



Analysis of all three indicators suggest that most of the streams and rivers of Cook County are highly degraded. This is most clearly shown by the IBI model, which predicted that 90 percent of the reaches will have IBI scores between 14 and 29. According to statewide IBI criteria, these streams would be considered to be in poor (28–34) to very poor (12–22) condition. Such degraded streams tend to be dominated by tolerant species, with many hybrids and few top predators. Indeed, sensitive native species have largely been lost from Chicago's streams and rivers.

Reaches in Cook County do appear to vary in quality. Fish species diversity and IBI scores showed similar patterns of variation. All else being equal, larger waters likely hold more fish species and have higher IBI scores. Higher diversity was also positively correlated with higher stream slopes and increased watershed

permeability, something that can affect substrates, flow, and other habitat characteristics. Among streams and rivers of the same size, slope, and watershed permeability, agricultural land in the riparian (stream- or riverside) zone increased fish diversity relative to urbanized land.

Like fish species richness and IBI scores, predicted mussel species richness increased with stream size, and mussel diversity and abundance strongly declined with urbanization in the riparian zone. Unlike fish, however, mussels were less abundant in high-gradient and coarse-bottomed streams. Indeed, most mussels have difficulty with substrates that are either too coarse (unable to burrow effectively) or too fine (get smothered); the gravel riffles they prefer are most common in lower gradient large streams and small rivers.

Reaches predicted to have the highest fish diversity and IBI include parts of Spring Creek, Poplar Creek, and the Upper Des Plaines River. Reach rankings based on fish diversity and IBI often coincided with one another and with expert opinion. High mussel diversity was also predicted for Spring and Poplar Creeks, but the highest diversity was predicted for some waterways that did not rank highly for fish diversity: Skokie Lagoons, the lower Des Plaines River, the Cal-Sag Channel, Plum Creek, and the Little Calumet River.

These high-diversity reaches are leading candidates for protection. In addition, some medium-diversity reaches along or flowing into the Calumet River, the Cal-Sag Channel, and the Chicago Sanitary and Ship Canal are also candidates because they are predicted to be the best dispersal sources available in their stream neighborhoods. In the future these reaches may facilitate restoration of nearby degraded waters.

Low-diversity reaches accessible to organisms dispersing from higher diversity reaches are good candidates for restoration. In this regard, tributaries of the Upper Des Plaines like Buffalo and Willow creeks and degraded reaches within Poplar Creek and other high-diversity watersheds rank highly for their restoration potential.

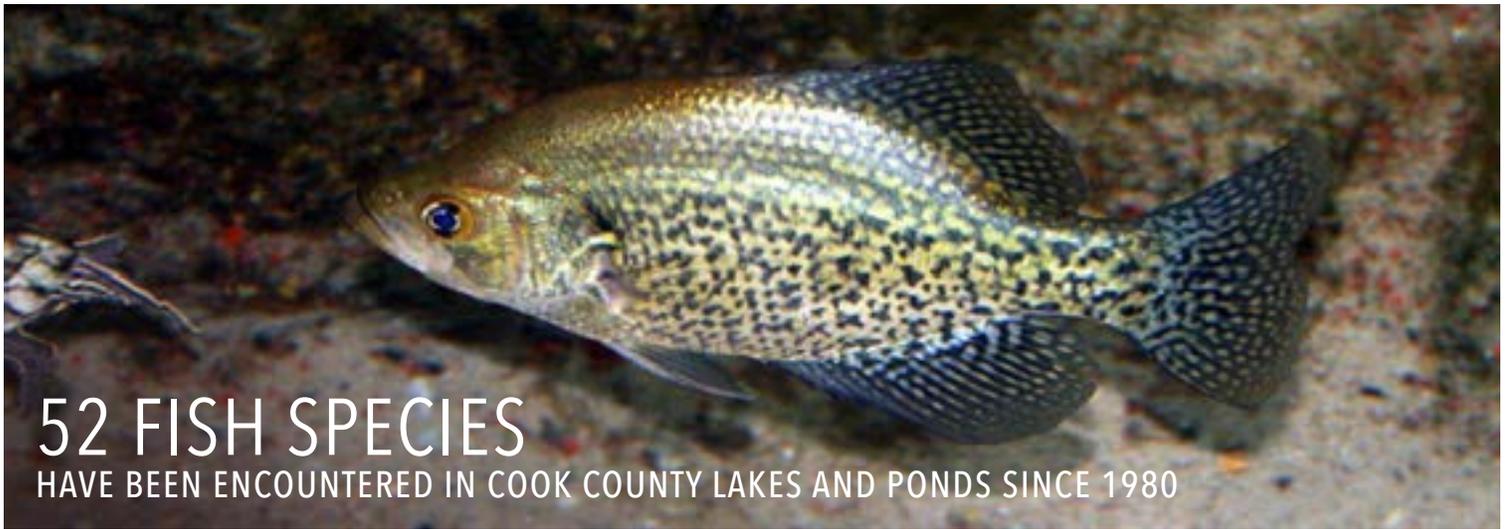
Already, removal of dams on the Upper Des Plaines has improved river connectivity. Removing or modifying other dispersal barriers—such as an impassable concrete ramp at the base of Tinley Creek—could help connect and restore native fish and mussel communities. Interconnected networks of streams and rivers do not adhere to political borders. Cook County is especially suited to multi-county (and multi-state) conservation coordination because many of its high priority freshwaters—e.g., Plum Creek and Spring Creek—lie near these borders and flow into or from other counties.

Modeling provides a useful first step in identifying candidate reaches for protection and restoration. Prior to investing in conservation action, however, sampling should confirm that the species diversity and biological integrity of a reach and its neighbors have been accurately predicted. Modeling on the reach scale may also miss localized quality habitats, such as spring-fed creeks about which county biologists may have important local knowledge, but lack systematic sampling data. Field studies are recommended to further assess local aquatic resources as well as to indicate which factors—e.g., dispersal barriers, habitat quality, water quality—most strongly limit them. If on-site reconnaissance confirms that the reach is suitable for conservation, these limiting factors should be the targets of future management action.

HOFFMAN DAM © INHS STAFF



**REMOVAL OF DAMS**  
ON THE UPPER DES PLAINES HAS ALREADY  
IMPROVED RIVER CONNECTIVITY



## 52 FISH SPECIES

HAVE BEEN ENCOUNTERED IN COOK COUNTY LAKES AND PONDS SINCE 1980



▲  
**LEFT TO RIGHT**  
 BLACK CRAPPIE © P. NIXON  
 WALLEYE © P. NIXON  
 RUSTY CRAYFISH © INHS

**LAKES AND PONDS** The FPCC manages 40 lakes for recreational fishing. All of these lakes are artificial and include both impoundments (formed by dams) and borrow pits (excavated to obtain road-building materials). To establish and maintain sport fish populations, Forest Preserves staff have stocked the lakes and improved fish habitats.

FPCC biologists and technicians have performed fisheries and water quality sampling on Cook County's lakes for more than four decades. Nearly 135,000 fish from 35 lakes were sampled between 1980 and 2012. Fifty-two species were encountered, of which 46 were native to the region. The top 10 most abundant species accounted for 88 percent of all captured fish, and the top 20 species for 99 percent. Numerically, the most abundant fish were bluegill (18.3 percent of sampled fish), gizzard shad (17.7 percent), and black crappie (15.1 percent). Among six non-native species collected were common carp (6.4 percent) and goldfish (0.2 percent). Sport fish included largemouth bass (7.6 percent), white crappie (3.6 percent), yellow perch (3.5 percent), channel catfish (1.8 percent), northern pike (1.3 percent), and walleye (0.8 percent).



THE EXOTIC  
**RUSTY CRAYFISH**  
 IS CAUSING THE DECLINE OF  
 SOME NATIVE CRAYFISH SPECIES

Recreational fishing lakes are regularly stocked to supplement the fishery. Since 1993, the IDNR State Hatchery System has stocked Cook County lakes with 1.2 million walleye, 675,000 channel catfish, 137,000 largemouth bass, 157,000 smallmouth bass, and 89,000 northern pike. Several Forest Preserve lakes also receive rainbow trout from state and private hatcheries during spring and fall trout seasons.

Many of Cook County's smaller water bodies do not hold large sport fish. Instead, ponds and wetlands in the forest preserves represent some of the more biologically intact waters in Cook County. They support many smaller native fish, like central mudminnows, along with diverse communities of invertebrates and amphibians and serve as the sources of many native species to neighboring water bodies. Protecting these sites is crucial to preserving aquatic biodiversity within the Forest Preserves of Cook County.

**CRAYFISH** No threatened or endangered crayfish are known from Cook County. However, the northern clearwater crayfish appears to be declining here, as it is throughout its range. This is due in part to habitat loss and in part to competition with the introduced rusty crayfish. The import, sale, and transport of live rusty crayfish is now banned in Illinois. Still, to protect the northern clearwater crayfish and other native species, we recommend that the Forest Preserves not allow the use of any live crayfish as bait.



SECTION

# 4

## Cultural Resources of Cook County

Many types of *cultural resources* are present on FPCC properties—landscapes, structures, and *archaeological sites* important to our understanding of the *prehistory* and history of the Chicago area, and the larger Great Lakes region. These locations contain information about how we lived and organized ourselves in the past, and how we used and altered our natural environment. Publicly held cultural resources, and the information they contain, are protected resources to be preserved, interpreted, and enjoyed by present communities and future generations. Unlike many types of natural resources, however, cultural resources are non-renewable; once destroyed, the information they contained is lost forever. The Natural and Cultural Resources Master Plan is designed to place priorities on the unique management needs of archaeological sites within the FPCC. The management needs of other types of cultural resources will be addressed in coming years.

# Archaeological Sites in Cook County

To date, approximately 1,200 archaeological sites have been recorded in Cook County. About 550 (or nearly 46 percent) of these are located on FPCC property. Even this indication of the importance of FPCC sites is understated as many of the 650 sites located outside of the FPCC have been destroyed by urban development. Furthermore, less than 20 percent of the forest preserves have been systematically surveyed. There is no doubt that FPCC lands contain hundreds of as yet undiscovered archaeological sites.



A wide variety of site types are present in Cook County, including small ephemeral (or short-term) prehistoric campsites; prehistoric seasonal habitation/resource procurement areas; large permanent prehistoric villages; prehistoric earthen mounds; prehistoric burials and historic cemeteries; river crossings and trails; early historic trading posts, taverns, and inns; pioneer cabins and farmsteads; early historic stage coach routes and plank roads; planned parks and gardens; and abandoned institutional and industrial facilities such as schoolhouses and mills.

Information collected from these sites indicates that people have been living in the Chicago region continuously for at least the past 10,000 years. The entire history of human occupation in Cook County is represented in the archaeological sites preserved within the FPCC—from the first Paleoindian travelers who entered the area after retreat of the glaciers, to the German prisoners-of-war living in barracks on Forest Preserve property during WWII. Of course, present day residents of Cook County continue to leave behind material evidence of land use, events, and human relationships for future archaeologists to uncover.

Both prior to and after European contact, the Cook County area was a key transportation corridor connecting the Great Lakes with the mid-continental heartland. At various times throughout

the long prehistoric period, native people created and maintained connections with other groups and places throughout North America. In the early contact and historic periods (ca. 1600–1900 A.D.), the region continued to be the scene of important political alliances, religious feuds, population movements, technological innovations, and economic partnerships—events often with global as well as regional implications.

Well-preserved archaeological sites are present within Cook County, in large part because of the nearly 70,000 acres of relatively undeveloped landscapes owned and managed by the FPCC. While FPCC lands comprise only 11 percent of the total Cook County land base, this acreage is concentrated in places that have always been most attractive to human settlement and use—land along significant rivers and drainages, resource-rich wetlands and backwater sloughs, upland moraines, and former Lake Michigan beach ridges. It is no exaggeration to say that our best, and often only, opportunities for learning about the early residents of northeastern Illinois lie on lands preserved and managed by the FPCC.

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ARCHAEOLOGICAL INVESTIGATIONS IN THE FPCC: 2012 & 2014, RESPECTIVELY © ISAS

RECORDING ARTIFACTS FROM THE ED LACE COLLECTION, ILLINOIS STATE MUSEUM © ISAS





## PALEOINDIAN PERIOD

10,000-8,000 B.C.



### Paleoindian Period

The post-glacial environment of Cook County was a young and fluid landscape of recently deposited glacial sediments, immature drainage systems, and large, poorly drained areas that remained as impounded lakes and marshes. We tend to think of Great Lakes water levels as relatively fixed, but they have varied dramatically through time. For example, 8,000 years ago Lake Michigan was much lower than today. But in the Paleoindian period water levels were much higher, with the shoreline sometimes located as much as 15 miles west of its present day location, covering low-lying areas of Cook County. During this time, people followed the high moraines and beach ridges in pursuit of game. Impounded meltwater areas progressively developed into resource-rich wetlands supporting a wide variety of plant and animal species used for food, clothing, tools, and shelter.

The initial Paleoindian groups that occupied this area likely arrived as small, mobile bands that moved throughout large territories in pursuit of caribou herds. Northeastern Illinois generally lacks good chert sources for making stone tools. (Chert is a type of stone easily chipped into durable tools with sharp edges.) These bands needed to have both knowledge of distant chert sources as well as stable social relationships with groups living in other parts of the Midwest and beyond. Tools found on Paleoindian sites in northeastern Illinois indicate travel to and/or trade between distant regions across the mid-continental United States.

Archaeological sites from this time period tend to be associated with water resources and elevated landscapes, both of which were used as transportation corridors. Most of these sites will represent short-term campsites that contained hearths, food remains, and scattered debris left from making or repairing tools. However, given the age of these sites, the most common items preserved at these locations will be stone tools and the debris from making or repairing them. The FPCC contains at least 8 sites with material dating to the Paleoindian period.



## ARCHAIC PERIOD

8,000-600 B.C.

### Archaic Period

Throughout this period, the climate and landscape changed considerably in northeastern Illinois. Prairie areas interspersed with oak savannas developed across the region, with ribbons of woodlands found along rivers and streams. Upland wetland pockets, sloughs, and well-defined drainage systems replaced the large glacial lakes and meltwater areas of the previous period. The Lake Michigan shoreline fluctuated several times throughout the Archaic period. Lower beach stages lie beneath the present lake while higher stages created a series of ridges that can still be seen throughout the metro Chicago area.

With changes in climate came new habitats with abundant and varied resources, including new riverine and forest habitats. Heavily used food resources included deer, smaller mammals, fish, reptiles, mussels,

migratory birds, and a rich diversity of nuts and seeds. New woodworking technologies and tools appear during this period, including the first occurrences of axes, atlatls, and dugout canoes. Fishing-related tools such as hooks and net sinkers are found on Archaic period sites, as are other new artifact types such as copper and bone tools and ornaments, and stone mortars and grinding stones for processing plant foods.

In northeastern Illinois, people began to settle into smaller, more restricted territories, moving seasonally between larger base camps and smaller camps located near seasonally available resources. There is some evidence for regional differences in food preferences, tool manufacture, and community organization between groups living in separate territories. Burial customs during the Archaic period are diverse and include group burials, burials within pits or earthen mounds, cremations, bundled or flexed burials, and the type we are most familiar with: individual extended in-flesh burials.

Sites in northeastern Illinois dating to the earlier portion of the Archaic period are still associated with elevated landscapes along transportation corridors and water resources. However, sites dating to the middle and later portions of the Archaic period are also frequently found in the uplands away from major waterways, positioned to take advantage of important woodland resources. Preservation of a wider variety of materials is possible on many Archaic period sites. Often these sites were occupied more intensively, more frequently, and/or for longer periods of time. Semi-permanent structures, storage facilities, hearths, and cemeteries are sometimes present. Generally, a wider range of activities occurred in these locations than occurred at the short-term campsites of the preceding Paleoindian period. The FPCC contains at least 96 sites with material dating to the Archaic period.

B.C.



## WOODLAND PERIOD

600 B.C.-A.D. 1100



A.D.



### Woodland Period

Many characteristics described above for the Archaic period continued throughout the Woodland period. However, a number of important technological innovations mark the transition into the Woodland period, including the introduction of pottery, development of the bow and arrow, manipulation of native plant species, the introduction of maize agriculture, and construction of earthen effigy mounds. Effigy mounds are animal, bird, reptile, and sometime human-shaped constructions built above ground from nearby soils; occasionally, effigies representing underwater or underworld creatures were dug into the ground surface, leaving a depression rather than a mound. Large midcontinent-wide trade networks increased at particular times throughout the Woodland period, including exchanges of raw materials, finished tools and goods, information, and ideas.

Early in this period, people continued to move frequently throughout the year, taking advantage of seasonally available resources, although there is some evidence for a slightly greater dependence on marsh and river floodplain environments. By about 200 B.C., the cultivation of native seed crops became an important supplement to hunting, fishing, and nut collection. Plants such as goosefoot, sumpweed, and sunflower were cultivated in floodplain environments, providing edible seeds that could be stored for later use. A dependable stable food supply allowed for population increases and the ability to maintain larger, semi-permanent settlements. By at least 800 A.D., maize was a regular, although probably small, part of the diet for most groups living in northeastern Illinois. The cultivation, processing, storage, and consumption of maize and native seed plants is reflected in changes in tool types and ceramic cooking vessels, as well as changes in group and village organization.

By the end of the Woodland period in northeastern Illinois, many groups were living in permanent villages that partially or occasionally dispersed into smaller seasonal satellite camps positioned to take advantage of specific plant and animal resources. However, some groups continued to move their entire settlements around the landscape on a seasonal basis. Sites dating to the middle and later part of the Woodland period are often found on bluffs and elevated uplands overlooking major river valleys, on terraces, and in river floodplains. The FPCC contains at least 102 sites with material dating to the Woodland period.



## Upper Mississippian Period

During this period, the Chicago region was occupied by agricultural groups growing corn, squash, and beans. These groups also continued to rely heavily on hunting and fishing, and on the cultivation of native seed plants. The ability to grow and store food for year-round use, and the necessity to stay near to and tend field crops, is often associated with larger populations, large year-round villages, increased social complexity and hierarchies, and sometimes increased conflict between regional groups. Evidence for the development of these types of communities is present at archaeological sites in northeastern Illinois.

The Chicago region contains a number of important and very large prehistoric village sites, many of which supported populations approaching 2,000 for at least part of the year. These archaeological sites frequently contain the below ground portions of houses, storage pits, hearths, and fortifications, as well as burials and above ground earthworks. Upper Mississippian period sites in the FPCC contain an abundance of well-preserved information about what people were eating, how they made clothing and tools, the types of houses they lived in, how they organized their families and communities, the nature of their relationships with neighboring groups, how they buried their dead, and what they may have thought about the afterlife.

Upper Mississippian period village sites are frequently found along rivers and large streams, near the intersections of prairie and forest environments, and on landscapes suitable for agriculture. Smaller seasonally occupied camps are often scattered along lesser drainages, near wetlands, and in upland settings. Smaller groups occupied these camps while hunting game and waterfowl, gathering plant foods, fishing, and gathering raw materials for making tools. The FPCC contains at least 100 sites with material dating to the Upper Mississippian period.



## CONTACT & EARLY HISTORIC PERIOD

### Contact and Early Historic Period

The southern Lake Michigan area was a heavily populated region immediately prior to European exploration and settlement. Many different native groups occupied the area, including the Potawatomie, Mascouten, Fox, Illinois, and Miami. Social boundaries and geographic territories of these groups shifted frequently throughout the 17<sup>th</sup> and 18<sup>th</sup> centuries. Contact-era sites are typically identified by the presence of European trade goods like brass kettles, iron implements, and glass beads. Often these goods were traded into the Chicago region long before any actual direct contact with European explorers and settlers occurred.

The first well-documented European explorers to enter Illinois were Father Marquette and Louis Joliet who, in 1673, returning from a trip along the Mississippi River, traveled up the Illinois River to the Des Plaines River to Portage Creek (the outlet of then Mud Lake), portaged their canoes about 1-1/2 miles across the continental divide, joined the West Fork of the South Branch of the Chicago River, and finally entered Lake Michigan through the Chicago River outlet. Marquette and Joliet were following a transportation route already well known to prehistoric and early historic native peoples. On this historic 1673 journey, Joliet indicated the ease with which a direct water route could be established linking the Saint Lawrence Seaway and the Great Lakes with the Mississippi River and the Gulf of Mexico. The critical link in this commercial super highway was the Port of Chicago and the Chicago Portage, and later the re-engineered Chicago River, the Illinois and Michigan Canal, and the Chicago Sanitary and Ship Canal.

The early European presence in Cook County can generally be characterized as beginning with French exploration and trade in the late 17<sup>th</sup> and early 18<sup>th</sup> centuries, British military control in the late 18<sup>th</sup> century, and the onset of American homesteading and settlement by the 1840s. A number of trading post sites, historic trails, river crossings, and fortifications, associated with both French and British trading and military activities, are located on FPCC lands. Several archaeological sites within the FPCC are associated with individuals and events important in the Fort Dearborn conflict of 1812, and the Blackhawk War of 1832.



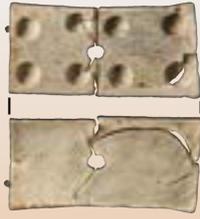
A.D. 1600-1870



A series of treaties between 1816 and 1833 transferred what is now Cook County from native groups to the United States government. Provisions of the final 1833 Treaty of Chicago granted 1,600 acres of land to Billy Caldwell, Jr. (Sauganash), 1,280 acres to Alexander Robinson (CheCebinquay), and 640 acres to Claude la Framboise, and their descendants. All three men were traders and interpreters of European and Native descent who played important roles in a number of treaty negotiations. Robinson is also noted as having assisted survivors of the 1812 Fort Dearborn conflict. Over the last two hundred years most of the acreage from these three reserves was sold to private individuals, but some portions of all three remain relatively undeveloped within FPCC holdings.

Immediately following ratification of the treaty in 1835, federal land surveyors began mapping the landscape, marking out 36 square mile townships, and further dividing each into one square mile sections containing 640 acres. American homesteaders and European immigrants then purchased these surveyed parcels from the United States government, often in multiples of 40-acre blocks at \$1.25/acre. By the 1860s, most of the property in Cook County once owned by the federal government had been transferred to private individuals; some property was granted directly to railroads and canal commissions for the construction of transportation corridors. The FPCC contains many examples of early homestead sites, cemeteries, and commercial properties from this time period.

Residents of Cook County served in the Union Army during the Civil War (1861–1865). While no battles were fought in Illinois, Cook County held the largest training camp for Union Army soldiers in Illinois, Camp Douglas. The camp, located on the south side of Chicago, also served as a Confederate Army prisoner-of-war camp during the second half of the war, and finally a mustering out camp for Union soldiers following the war's end. Anecdotal evidence exists for the presence of additional, smaller Civil War training grounds located on FPCC property; however, these suggested locations have not yet been professionally investigated. Nonetheless, the FPCC contains at least 31 known sites with material dating to the Contact and Early Historic period (1673 through 1870).



## HISTORIC PERIOD—WORLD WAR II

A.D. 1870-1950



### Historic Period through World War II

By the late 19<sup>th</sup> century, Chicago was a rapidly expanding urban metropolis, a place where important social, economic, and political events unfolded that both reflected and influenced larger national attitudes and policies. Progressive visionaries living and working in the Chicago area—from the fields of architecture, landscape design, social reform, urban planning, commerce, labor, and education—often advocated for the preservation and interpretation of the city's history and (at that time, relatively unknown) prehistory. A celebration of a collective past was one means of integrating Chicago's otherwise disparate economic classes and immigrant communities.

The inception and early development of FPCC management programs were closely aligned with the policies and attitudes of Chicago's early city planners. Along with wilderness preservation, these visionaries worked to place well-designed "natural" spaces into urban environments, and to bring city residents out into wild spaces. Many examples of early designed landscapes and architectural elements are present within the FPCC, including the Skokie Lagoons and the more recently constructed Chicago Botanic Garden. The remains of many early designed recreational facilities (such as ski hills, skating rinks, lodges and shelters, outdoor dance pads, walkways, golf courses, ball fields, boat launches, swimming holes, and camp grounds) are still present in the FPCC.

Important events in our nation's history occurred on property now managed by the FPCC; above-ground structural remains and below-ground archaeological deposits are present in these locations. Places and events of note include the Chicago Portage National Historic Site (described above), Red Gate Woods Preserve containing the original site of Argonne National Laboratory and the buried remains of the world's first nuclear reactor (Chicago Pile-1), and several World War II German prisoner-of-war camps including Camp Thornton in Sweet Woods Preserve, Camp Pine in Camp Pine Woods Preserve, and Camp Skokie in Glenview Woods Preserve. In addition to locations listed in the two preceding paragraphs, the FPCC contains at least another 100 sites with material dating to the Historic through World War II period (1870 through 1950).





SECTION

# 5

## Natural and Cultural Resources Threats and Needs

The FPCC lands face many threats. The plants, animals, and archaeological sites have to withstand the intensity of human activity in the surrounding urban areas—and in the preserves themselves. In this section we explore the variety of threats and how they can be addressed to protect Cook County's remaining natural and cultural resources.

# Threats Identified by FPCC Staff and Constituents

Analysis of staff and constituent input identified invasive species, stormwater runoff, overabundance of white-tailed deer, flooding, water quality, altered water resources, lack of fire, habitat fragmentation, urban development, and erosion as the primary natural resources issues facing the Forest Preserves of Cook County (Figure 5.1). Among these issues, invasive species and stormwater runoff were the two most commonly cited by the stakeholder groups.

Some ecological problems were perceived to be related. For instance, spread of invasive species was viewed as being furthered by salt in stormwater runoff and by lack of fire. Stormwater runoff was thought to cause serious changes in the structure of water bodies and in water quality and flow. Urban development was viewed as a problem

in its own right and also thought to cause habitat fragmentation. The stakeholder groups linked the Forest Preserves' ecological problems to several social, political, and management issues, such as: (1) improper and/or insufficient management activities; (2) political pressure; (3) small but vocal opposition to certain management activities; (4) illegal collecting of plants and animals; (5) lack of public awareness of the importance of natural resources; (6) differences between the public's and Forest Preserves' land use values; and (7) limited financial and human resources.

Knowledge about the Forest Preserves' cultural resource problems was fairly limited among all the stakeholder groups. However, analysis of stakeholder input revealed that the major perceived cultural issue is damage through vandalism or

digging to illegally collect artifacts, such as coins, found using metal detectors. Other less reported issues included: (1) lack of public awareness about cultural resources; (2) urban development and expansion; (3) insufficient data on cultural resources; (4) lack of management and maintenance plans and activities; (5) deterioration due to natural forces and wear and tear; (6) impacts from recreation; and (7) public access to archaeological resources (Figure 5.1).

Many of these perceived threats were observed first-hand by PRI staff and also validated by scientific evidence. The following sections describe the nature and consequences associated with these issues and provide recommendations on how they might be addressed.

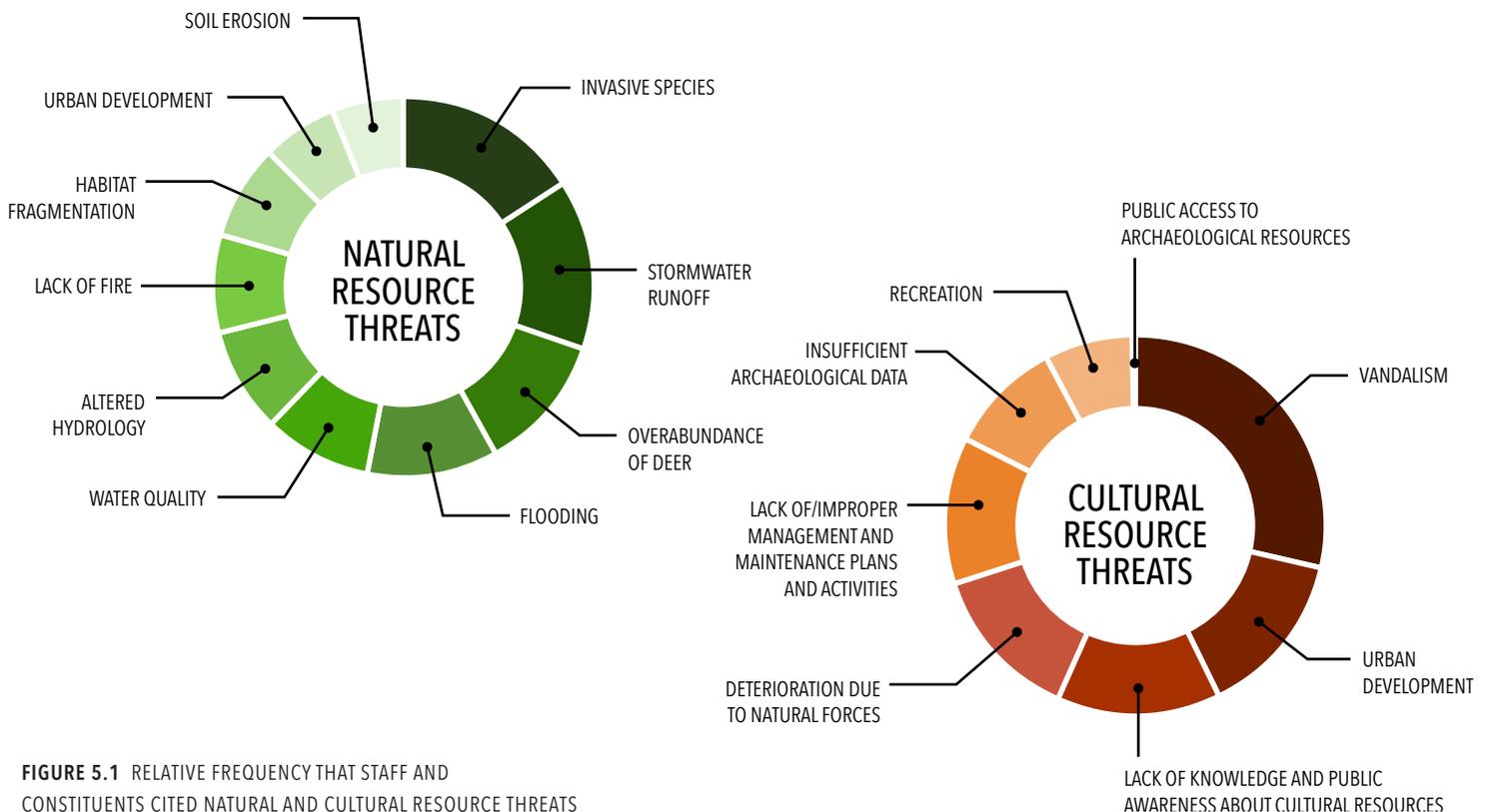


FIGURE 5.1 RELATIVE FREQUENCY THAT STAFF AND CONSTITUENTS CITED NATURAL AND CULTURAL RESOURCE THREATS



## INVASIVE SPECIES OFTEN OUT-COMPETE NATIVE SPECIES

### Invasive Species

Invasive species are any plants or animals that grow and reproduce quickly and spread aggressively. Most are exotic species not normally found in the region. In a few cases, invasive species spread to new regions on their own or are driven by natural forces, such as birds that cross oceans driven by hurricanes. In most situations, however, they are moved by people, often unintentionally. For example, ships carry aquatic organisms in their ballast water or attached to their hulls. This is how zebra mussels and round gobies were introduced into the Great Lakes. Another way people spread invasive species is using wooden shipping crates that contain plant seeds or insects. This is probably how the emerald ash borer,

discussed further on page 63, reached North America. People also release pets into the wild. Iguanas and Burmese pythons are thriving in Florida, causing problems to the ecosystem and posing a health threat to people.

Exotic species often arrive in their new environment without the animals that eat them and the diseases that weaken or kill them. They can then spread quickly, sometimes out-competing species native to the area. They may also cause or carry disease, prevent native species from reproducing, or alter conditions in an ecosystem, such as changing soil chemistry or disrupting the food web. Global warming may benefit invasive species that are more suited to warmer temperatures, dominating an area, while native species suffer under changed conditions.

ROUND GOBY © W. STACY ▲

**INVASIVE PLANTS** The woodlands and forests of Cook County are especially vulnerable to invasive plant species. Many have become infested with buckthorn, Japanese barberry, and bush honeysuckle. Buckthorn is so thick in some forested areas that the plants cannot be walked through. The ground is so shaded by the invasive shrubs that native plants cannot grow and the ground is bare or covered in leaves. Many of the preserves along the Des Plaines River corridor have problems with Japanese barberry. On a positive note, intensive efforts by the Forest Preserves, especially through their volunteer stewards, are reducing garlic mustard on many of the preserves. Regardless of the species, it is important to remove these plants so native plants and animals can thrive.

**LEFT TO RIGHT**

BUCKTHORN © C. CARROLL-CUNNINGHAM

PURPLE LOOSESTRIFE © M. JEFFORDS

REED CANARY GRASS © P. MARCUM



Wetlands are also particularly sensitive to invasive species like purple loosestrife and exotic grasses. Formerly diverse sedge meadows, like those in the Spring Creek area, have been completely overcome by reed canary grass and common reed. Salt from roadways runs into wetlands, changing conditions so a few species, often cattails, dominate. Many wetlands that once hosted a variety of water-loving plants are now choked full of a single undesirable species.

Despite these challenges, the Forest Preserves of Cook County are successfully managing invasive plant species in some of the preserves. These efforts have protected rare ecosystems and set natural processes back in order. Work must continue across the county to remove invasive species and restore the ecological health of native habitats. In lands under active management, native species are not only present, but also they dominate the species composition and even rare and disturbance-sensitive species persist.

These positive responses are largely the results of prescribed fire and invasive species removal, either by the use of herbicides or through hand removal. Both contractors and volunteer stewards are involved. Hand removal is very labor-intensive, so augmenting work by contractors with volunteers can be effective. The FPCC has procedures to burn brush piles, and many stewards have been trained in the safe application of herbicides. FPCC staff and contractors are trained in the application of prescribed fire, and their burns can reduce many invasive species to levels that allow native species to effectively compete with them. While significant progress has been made in expanding invasive species control within the Forest Preserves of Cook County in the past decade, further expansion will be needed to achieve the goals of the Next Century Conservation Plan, which recommends 30,000 acres be restored to Illinois Natural Areas Inventory quality, a very ambitious goal.

## FORESTS & WETLANDS ARE PARTICULARLY VULNERABLE TO INVASIVE PLANTS



**INVASIVE INSECTS** Invasive insects like the emerald ash borer (EAB) and the Japanese beetle are eating their way through the forest preserves. These exotic insects are spreading through North America unchecked by natural enemies.

The impact of EAB is noticeable in nearly every preserve. The standing dead native ash trees seen around the many pocket wetlands and throughout the forests are a result of the EAB. Although the Forest Preserves have actively removed EAB-killed trees where they would negatively impact the public, EAB effects can be seen easily at Allison Woods, Dan Ryan Woods, Deer Grove, Palos Preserves, and Possum Hollow Woods.

Japanese beetles that have gradually moved eastward across the United States formerly were found mainly devouring garden and yard plants. In the past several years, they have been increasingly found eating wildflowers in the prairies, wetlands, and forests of the preserves.

Both of these invasive insects are disrupting native habitats, causing opportunities for invasive plants to infest disturbed areas, reducing seed production of wildflowers, and reducing habitat and food plants for other native wildlife. No practical means of fighting these invasive insects are currently available. Until a biological control measure is developed to fight these pests, their impacts will continue to be evident in the forest preserves.

**INVASIVE DISEASE-CAUSING ORGANISMS** A sometimes overlooked type of invasive exotic species are disease-causing organisms. An example familiar to many people in Cook County is West Nile virus, which is transmitted by mosquitos and can be lethal to humans, horses, and some birds. Because the forest preserves are imbedded in an urban and suburban landscape, understanding plant and animal communities and the diseases that affect them will be critically important to protect their health and that of the people of Cook County. Equally important will be understanding wildlife movements within the preserves and adjacent areas. The forest preserves are an outdoor laboratory that is being used to track emerging infectious diseases as they appear on the landscape. The FPCC and its partners should continue to study, document, and track the presence of diseases that affect wildlife and plants, especially those that are transmitted by insects and other arthropods, to protect the health and wellbeing of the flora, fauna, and general public.

**LEFT TO RIGHT**

EMERALD ASH BORER © P. NIXON

JAPANESE BEETLE © M. JEFFORDS



THERE ARE CURRENTLY NO PRACTICAL MEANS AVAILABLE TO FIGHT INVASIVE INSECTS

## Stormwater Runoff

When it rains in the city, water runs off rooftops, across cement and blacktop, picking up dirt, chemicals, and wastes along the way. This polluted water runs into storm sewers or directly into lakes, rivers, and streams, harming the plants and animals that live in or near them in various ways. Stormwater runoff occurs in cities because rain water cannot soak into the ground as it would in natural areas. The more developed the location, the more stormwater runoff is produced. In fact, a typical city block generates more than five times the runoff as a woodland area of the same size.

Flooding is the most obvious impact of increased stormwater runoff. The Metropolitan Water Reclamation District has identified numerous sites in Cook County subject to stormwater-related problems. Many of these are in forest preserves, especially along the Des Plaines River and some of the larger streams throughout the county (Figure 5.2). Flooding drowns native plants and causes long-term changes in plant communities, often disrupting the animal communities living there.

Erosion is increased by stormwater. In highly developed areas, much of the runoff enters underground storm sewer systems that direct water at high velocity into streams and channels. As it empties into waterways with excessive force, it can blast out stream banks, damaging vegetation, eroding waterways, and washing away important river or stream habitats. In contrast, the uneven and porous ground in forested and grassy areas traps rainfall so that it filters slowly into the ground.

Water temperature is also higher in cities because the water runs across streets, rooftops, and parking lots. Once the water reaches rivers and streams, the higher water temperatures can be harmful to the health and reproduction of fish and other aquatic life.

Stormwater runoff is a major source of water pollution. After a rainstorm, water runoff picks up oil; grease; pesticides and nutrients from lawns and gardens; viruses, bacteria, and nutrients from pet waste and failing septic systems; road salt; and metals from roof shingles and motor vehicles. Urbanization increases the variety and amount of pollution carried into rivers, lakes, and streams, causing significant harm to the environment.

Material carried by stormwater degrades habitats. Sediments cloud the water, blocking the light plants need to grow. Trash such as plastic bags and cigarette butts washed into waterways is harmful to fish, ducks, turtles, and birds. Excess nutrients can cause algae blooms in rivers and streams, removing oxygen needed by aquatic organisms to survive.

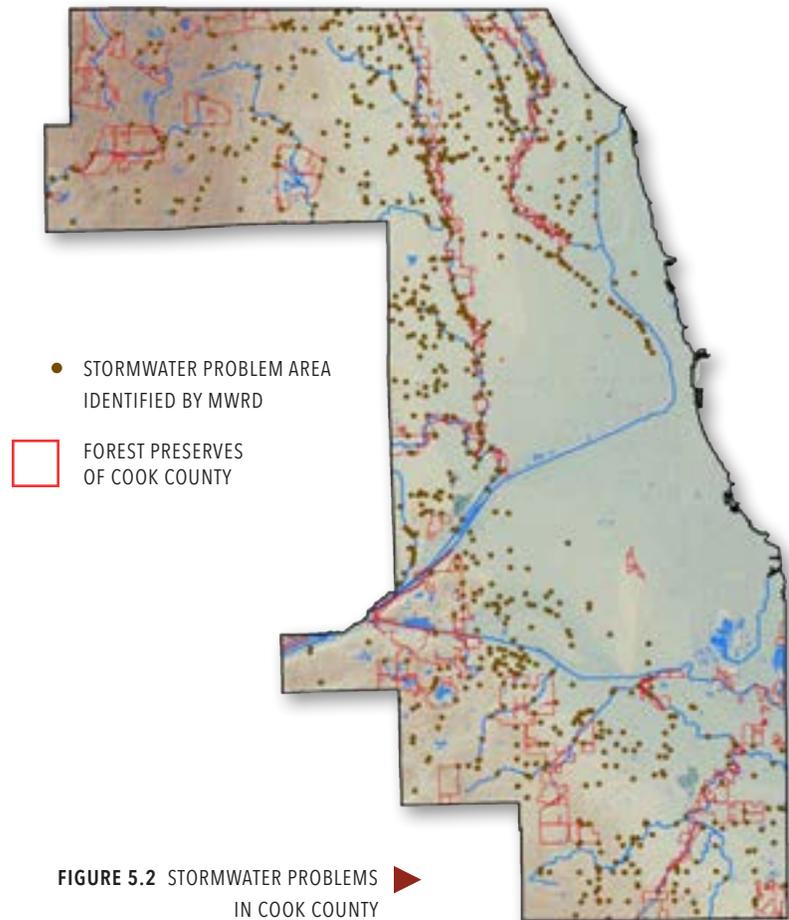


FIGURE 5.2 STORMWATER PROBLEMS IN COOK COUNTY

Climate change is expected to increase stormwater runoff and flooding in the Chicago region. Just in the past two years with the increase of rainfall events of 2.5 or more inches in a 24-hour period, communities in Cook and surrounding counties are looking for new ways to reduce flooding and find additional places to divert flood water. Existing wetlands always seem to be the answer of where to divert the water, and the forest preserves are the largest source of wetlands. Yet they already suffer the brunt of the damage.

The premise that healthy natural landscapes are “natural sponges” that absorb excess flood water and improve water quality is largely correct. But sponges can only hold so much water before they begin to fail. The forest preserves cannot take on the responsibility of the current flood and stormwater loads, let alone future increases. Further degradation and the loss of wetlands and other natural habitats in the Chicago region will affect not only animals and plants, but also the quality of life for the citizens of Cook County. This year alone PRI scientists saw these impacts to nearly every forest preserve in the county.

Urban communities and their citizens need to work with the FPCC and state and federal regulatory agencies to alleviate stormwater-related issues. Scientists and engineers at the ISWS can assist by using hydrologic and hydraulic models to analyze stormwater issues in stream and river systems and propose options to reduce flooding and erosion.

EROSION CAUSED BY  
STORMWATER DISCHARGE © C. BENDA



**FLOODING**  
CAN CAUSE LONG-TERM CHANGES IN PLANT COMMUNITIES



## STREAMS AND RIVERS MAY BE FRAGMENTED BY DAMS AND LEVEES



DAM ON DES PLAINES RIVER © C. BENDA

### Habitat Fragmentation

**F**ragmentation is breaking natural habitats into small areas separated by regions without native species, for example agricultural fields or urban or suburban development. Streams and rivers may be fragmented by dams and levees, or by reaches with poor habitat or impaired water quality. Fragmentation often creates difficult conditions for the plants and animals that remain. The area may be too small to support many individuals of a species. This can cause a loss of genetic diversity, leading to reproductive problems or a limited ability to adapt to changing conditions. Area-sensitive animal species, especially certain birds and large carnivorous mammals, may not even occupy a site if it is too small. Invasive species often do

better in fragmented habitats, allowing them to displace native species. Storms, droughts, floods, or other environmental disturbances may kill all the individuals of a species living in a small area. Because the area is isolated, it may be too far away from similar habitats for the species to recolonize. All these effects reduce biodiversity. The impact becomes greater as sites become smaller and more isolated, and the longer they remain fragmented. It is important to preserve the largest sites possible and to connect them with corridors of habitat that allow plants and animals to disperse among sites.

## Lack of Fire

Before Europeans settled in Cook County, early explorers documented the presence of fire sweeping the state from both natural and human causes. The vegetation found here at that time developed from, was adapted to, and depended on a fire regime. As Cook County became more developed, fire was increasingly suppressed to protect property and human life. People also thought fire damaged natural resources, a fear that persisted into the middle of the 20<sup>th</sup> century.

Only in the past 40 years has fire been reintroduced into fire-dependent habitats in northeastern Illinois. Prescribed fire has now become a standard natural resource management tool nationwide. Fire management increases plant diversity, benefits many wildlife species, reduces invasive species, and creates esthetically desired landscapes for preserve users. Still, misunderstandings about the vital role of fire, a shortage of trained personnel to conduct prescribed burns, questions about appropriate fire frequency and seasonal timing, regulations impeding use of fire in urban areas, and the need for more research into proper fire management of some natural communities persist.

The Forest Preserves staff has shown an increased use of this economically viable management tool within the past decade. Currently the Forest Preserves retains four fire crews and supplements that with six to 10 contracted crews. Examples of preserves where the fire management is currently being used successfully include the Spring Lake Preserve, Ned Brown (Busse Forest) Preserve, Schiller Woods South, Che-Che-Pin-Qua Woods, Somme and Shoe Factory Prairie Nature Preserves, Harms Woods, McGinnis Slough, Spears and Willow Springs Woods, Sand Ridge, Burnham Prairie, and Powderhorn Lake Nature Preserve, to name a few. Still, there is ample need for more application of burning throughout the preserves, and the FPCC is committed to delivering more—and more effective—burns.

PRESCRIBED BURN © J. OCCHIUZZO



**FIRE MANAGEMENT**  
INCREASES PLANT DIVERSITY AND BENEFITS MANY WILDLIFE SPECIES

## Deer Overabundance

White-tailed deer grazing on wildflowers in the woods or bounding across a pasture are a sight to behold, but an overabundance of deer has its downsides. Appearing more often in the suburbs, a growing deer population boosts the chances of deer-vehicle collisions, disease and disease transmission, overgrazing of plants, and spread of invasive species.

**DEER-VEHICLE COLLISIONS** Cook County has the most deer-vehicle collisions in the state, with 460 in 2012 alone, according to the Illinois Department of Transportation. An increasing number of vehicle accidents happen when deer adapt to living in suburbs and cities and their populations grow, or when the number of vehicles on roadways increase. In addition, forest areas and streams, such as those in the forest preserves, are ideal locations for deer to seek shelter and forage, increasing the likelihood of them straying onto adjacent highways.

**DEER DISEASES** Disease outbreaks become more widespread when the deer population exceeds the environment's ability to sustain it. Large populations of deer become more vulnerable to disease, particularly if food becomes scarce. Chronic wasting disease (CWD) is fatal to deer. CWD is contagious among deer herds, causing the brains of infected animals to waste away. The Illinois Department of Natural Resources reported 59 cases of CWD statewide in 2014. Thus far, 13 counties have been affected by the disease. Cook County has had no cases detected, but CWD has been reported in adjoining Kane, Lake, McHenry, and Will counties. When there are large populations of deer in one place the likelihood of CWD spreading increases.

Another fatal disease, epizootic hemorrhagic disease (EHD), works much more quickly than CWD. Once bitten by the midge, a flying insect that carries the disease, deer exposed to the virus may die within days or even hours. Large groups of deer are attracted to water where the midge appears.

An outbreak of EHD occurred in northern Cook County in 2012, partly because of the especially hot and dry summer. The Forest Preserves of Cook County reported about 90 deer that had died from the disease. Since EHD is so lethal, it can have a large effect on the deer population locally, particularly at high population densities. An outbreak usually ends in the fall when the frost kills off the infected insects.

WHITE-TAILED DEER © M. JEFFORDS ►

RUNNING WHITE-TAILED DEER © C. BENDA ▼







## EATING HUMAN FOODS MAY CAUSE SERIOUS HEALTH PROBLEMS FOR DEER



### LEFT TO RIGHT

DEER EATING CORN COB © C. BENDA

DOE AND FAWN © M. JEFFORDS

DEER AT BUNKER HILL © C. BENDA

**OVERGRAZING BY DEER** As deer herds grow, there may be too many deer and not enough food. Their large numbers pose a risk to themselves and to plants and animals. Deer are hearty eaters; you can tell when a forest has too many deer because a “browse line” can be seen. All the plants are eaten as high up as the deer can reach. When they eat all the plant undergrowth, they remove the covering that serves as nesting spots for ground-nesting birds and cover for frogs and salamanders. Overpopulated deer herds can also reduce the number of woody plants and increase the crop damage for Illinois nurseries and gardeners. When too much plant material is removed, deer no longer have an adequate supply to sustain the herds. Starvation can result.

Still, feeding deer and other wild animals the foods that we eat is no solution, and can be very harmful. Our foods contain preservatives and other chemicals which may cause serious health problems in deer. Also, wildlife may lose their fear of humans, becoming a nuisance in recreational areas. For the best nutritional value, deer should eat the foods they find naturally in the forest preserves.



**DEER MANAGEMENT** White-tailed deer are particularly abundant in the Forest Preserves of Cook County and are often a point of interest to preserve visitors. However, as a result of the increasing population size and limited management measures, deer are seriously impacting the native wildflowers and shrubs the forest preserves were created to protect. Browse lines within the forested sites and damage to wildflowers are observed in nearly every preserve. The loss of the native vegetation leads to additional concerns such as increases in invasive plants deer find unpalatable, soil erosion from denuded herb layers, and decreases in nesting success for ground-nesting birds. It also may increase the incidence of Lyme disease, which is transmitted by deer ticks.

To date there are no safe or practical non-lethal methods available to natural resource agencies for managing deer overabundance. Contraception methods either require repeat captures of individuals, which is impractical, or large doses of contraceptives that would pose a health risk if a treated animal were somehow eaten by humans, dogs, or coyotes. Moving deer to another location is not practical because no enclosed facilities are available to take them, and movement of deer and release to the wild is not allowed by the State of Illinois because of documented high levels of subsequent deaths and the potential for disease transfer, for example CWD. Gun hunting is not allowed in Cook County and, due to high human population densities, unlikely to ever be allowed. Bow hunting has only been shown to be effective in managing deer populations in very limited situations.

The FPCC has implemented a limited deer management program employing sharpshooters in a few preserves, and the results of these efforts are both obvious and significant. The native flora and fauna of these areas are in much better condition than areas where management efforts have not been used. Deer-vehicle collisions are also reduced in these areas. Furthermore, deer are healthier in these areas. However, to achieve the goals it will be necessary to expand current efforts. Such an expansion will require developing and initiating an extensive public education and engagement strategy with a special focus on neighboring landowners.

## Poaching, Collecting, Looting, and Vandalism

**NATURAL RESOURCES** Hunting, trapping, and the taking of anything wild are illegal in the Forest Preserves of Cook County. Yet poaching, the illegal taking or possession of game and non-game animals, fish, and other resources, is a serious problem. Most poachers are professional hunters with high-tech equipment, but they also include those who gather a bouquet of wildflowers to take home. Forest Preserve resources most often poached are deer antlers or meat, owls and falcons, salamanders, frogs, turtles, and snakes, and morel mushrooms, orchids, wild onions, leeks, and ginseng, all of which can be sold for a profit.

The number of animals killed by poachers every year is unknown, but estimates show that in some places poachers can take as much fish and game as licensed hunters and fisherman do during the legal seasons. Areas that poachers use the most are those that are least accessible to the public, the more secluded areas farthest from roads. Forest Preserve police occasionally find deer stands, bait traps, or other signs that deer and other wildlife have been killed or caught.

The Cook County ban on hunting was originally enacted to protect wildlife in forest preserves. But Cook County is also one of the top counties in the state for the number of endangered plants and animals, and the law is designed to also protect these species from disappearing. Poaching robs future generations from enjoying endangered species. Poaching also decreases business and government revenues generated by licensed sportsmen and women.

**CULTURAL RESOURCES** Archaeological resources on FPCC lands are publically held, non-renewable resources. State and federal laws protect these cultural resources, and there are stiff penalties for looting or disturbing archaeological sites. Individuals and groups with an interest in illegally “digging for treasure” sometimes find and remove artifacts from sites within the FPCC. Metal detecting on, and removing artifacts from, FPCC lands is also illegal. The activity of digging within site areas destroys important information contained in the context of the found artifact; for example, what other materials were located nearby? How deep was the item? While the loss of artifacts themselves is a significant problem, it is even more troubling that through looting, metal detecting, and vandalism, our community loses the ability to learn about Chicago’s past.

**RESOURCE POLICING** Forest Preserves police rely on citizens to help catch poachers. The IDNR has a “Target Illinois Poachers” program to encourage citizens who witness poaching to report the violation. Information can be reported to a toll-free number or by e-mail to the IDNR. If Forest Preserve police or other law enforcement officers issue citations, offenders may face a court appearance and a fine for stealing natural resources.

In response to concerns expressed by staff and constituents over the poaching of legally protected or rare plants and animals and the looting of archaeological sites, Forest Preserves police should receive additional education about protecting natural and cultural resources. It is understandable that in a county with as large a population as Cook County, the majority of law enforcement’s time will focus on managing visitor usage, traffic, and responding to emergencies; in other words, general policing. It has been suggested that balancing general policing and conservation policing responsibilities, exercising discretion in enforcement, and educating the public about the impacts of poaching can deter poaching without increasing poacher defiance. The same can be expected with cultural resource policing and education.

Providing FPCC police with information about vulnerable plant and animal populations and archaeological sites, and about the tools and techniques used by poachers and looters could contribute to deterring poaching and looting without significantly impacting the general policing responsibilities of Forest Preserves police. Much of this training could come from FPCC conservation staff, Prairie Research Institute staff, or Illinois Department of Natural Resources conservation police. Based on the results of these initial initiatives, a better informed decision could be made concerning the necessity of increasing the number of FPCC police or creating specialized conservation police units to address poaching and looting. Applications of field sensor and remote-sensing technologies could also be employed to protect high-priority archaeological sites and legally protected populations of plants and animals.





TAKING ANYTHING WILD IS  
ILLEGAL IN THE FPCC

# WATER LEVEL CHANGES

## IN WETLANDS CAN RESULT IN THE LOSS OF RARE SPECIES



MAN-MADE DITCH © C. BENDA

## Altered Water Balance in Wetland Habitats

The Forest Preserves have many unique wetland habitats because of the types of glacial soils present, stable ground and surface water sources, and the native vegetation that depends on them. Fens, seeps, wet prairies, flatwoods, and marshes all provide specialized habitats for many rare plant and animal species. Altering the water balance creates catastrophic changes within these habitats. These changes may result from simply creating a shallow ditch, not removing old drainage tiles, raising the height of a trail to keep it from flooding, diverting water from stormwater runoff into wetlands, or creating a series of drainage ways to reduce mosquito populations.

These changes in water levels create opportunities for invasive plant species and aggressive low-quality native plants to completely change the diverse native plant cover and cause the loss of rare native wildlife species that depend on these habitats. The need to recognize and correct sites with altered water resources is a critical issue that should be addressed to save some of the oldest wetlands in northeastern Illinois. All the forest preserves are affected by this ecological issue, notably Beaubien Woods, Cap Sauers Holding, Deer Grove West, Harms Woods, Kickapoo Woods, Palos Preserves, Sand Ridge Nature Center, Thatcher Woods, Tinley Creek Ravines, and Watersmeet Woods, to name a few.

## Soil Erosion

The majority of the forest preserves are located on glacial ridges or moraines dissected by the Des Plaines River, the North Branch of the Chicago River, and the now channelized Calumet River, as well as their tributaries. The soils making up the ridges are considered young in “soil age” in their development and depth and often cover thick deposits of glacial till, gravel, and sand. With the steepness of the slopes created by the rivers, soil erosion may occur rapidly and sometimes severely when the integrity of the soils’ water-holding capacity is compromised by some action other than normal rainfall. Once the protective mantle of soil is washed away, the loosely consolidated layers of sand, gravel, and till may erode very quickly. The sediment then washes into streams, rivers, and wetlands, damaging them and the plants and animals that live there.

While heavy rainfall occurrences are increasing with climate change, the other associated actions influencing erosion are human-caused. Two of the more common and most destructive actions noted were the diversion of stormwater from both within and off preserve land and the creation and use of unofficial trails, mainly by mountain bikers or equestrians, on steep slopes or near bluff edges. A combination of education and enforcement should be employed to minimize the creation and use of unofficial trails. Other actions that increase erosion within the preserves are ATVs, recreational or other development in sensitive areas, and poorly engineered structures unable to handle drainage problems. Existing water control structure maintenance is too often lacking. Preserves with erosional issues include Che-Che-Pin-Qua Woods, Deer Grove West, LaBagh Woods, Paddock Woods, Red Gate Woods, Schiller Woods, Swallow Cliff Woods, Sweet Woods, and Tinley Creek Woods.

Erosion can also damage cultural resources. Important archaeological sites are often located along rivers and streams. Erosion along riverbanks cuts into archaeological deposits, leaving artifacts and information to flow downstream and be redeposited, meaning this information is now out of context in another location. Flooding events scour and destroy archaeological site landscapes, as well as cover over sites located on stream terraces. The rate of erosion and flooding along drainages in the FPCC is increasing along with the intensity and frequency of stormwater run-off events within the Chicago region. The effects of stormwater control measures on downstream and upstream archaeological sites within the FPCC should be considered in the early planning stages of these programs.

RIVER BANK EROSION © C. BENDA



**SOIL EROSION**  
CAN DAMAGE NATURAL HABITATS AND ARCHAEOLOGICAL SITES

# CHLORIDE

IS TOXIC TO MOST FRESHWATER  
ORGANISMS



# INCREASED CHLORIDE LEVELS

FAVOR LOW-QUALITY, CHLORIDE-TOLERANT SPECIES

## Water Pollution

Heavy urbanization in the Chicago region has impacted water quality in lakes and rivers. Wastewater, which comprises about 70 percent of flow in the Chicago River, contributes to increased nutrients. According to the National Atmospheric Deposition Program, nitrate levels in the Chicago region are among the highest in the nation. Elevated nutrients can choke waterways with overgrowths of algae and aquatic plants, whose night-time respiration and eventual decomposition reduce oxygen levels and occasionally cause fish kills.

Waterways receive contaminants of all kinds from their surroundings. Pharmaceuticals and personal care products are prevalent in urban waters. These pollutants derive from prescribed and over-the-counter drugs, and from fragrances, lotions, and cosmetics. Pesticides and fertilizers are most commonly associated with agriculture, but they are also applied to urban lawns and gardens. Apply too much or too often and the excess is washed into receiving waters.

A recurring problem for Chicago has been combined sewer overflows—flooding events during which a mixture of runoff and raw sewage overflows directly into surface waters. The Metropolitan Water Reclamation District's (MWRD) Tunnel and Reservoir Project increases storage capacity to reduce the incidence of combined sewer overflows. In addition, the MWRD has recently adopted disinfection measures at its Calumet and O'Brien Water Reclamation Plants. Furthermore, many municipalities are separating sewerage systems from stormwater systems. (However, this is increasing stormwater discharge directly into streams and rivers, increasing the risk of flooding and erosion.)

Certainly since the early 1900s, when the Chicago River operated as an open sewer, water quality in Cook County has improved. More recently, the EPA found that concentrations of ammonia and pesticides decreased between 1991 and 2001 across urban areas of the Upper Illinois River Basin. To determine if this trend has continued, researchers at the PRI looked at data collected by the MWRD, which monitors water quality in the Chicago area. They used data from 68 sampling sites for the period 2000–2012.

Spatially, water quality was better in watersheds with less urban land use. Downstream reaches accumulate pollutants from their entire drainage basin. The effects of wastewater inputs were particularly noticeable. For example, high concentrations of phosphorus occurred downstream of the Calumet and Hanover Park Water Reclamation Plants. Today's water treatment methods alleviate the worst offences, but they cannot make the city's waste disappear.

Confident identification of long-term trends in water quality was complicated by year-to-year variability in driving factors like temperature and precipitation. Still, between 2000 and 2012, many measured water characteristics—including nitrogen, phosphorus, sulfate, total organic carbon, fecal coliform bacteria, and suspended solids—showed general patterns of decline, indicating improved water quality.

A notable exception was chloride. Seasonally, chloride concentrations in surface water peak during winter (December–March) when road salt (mostly NaCl) is applied to keep drivers safe by melting snow and ice. Even after correcting for these seasonal patterns, chloride increased in Chicago waterways between 2000 and 2010. Concentrations did show a sharp decline in 2011–2012 when the city recorded its 9th warmest winter ever. However, 2013–2014 witnessed the 3<sup>rd</sup> coldest winter on record, and road salt applications returned to high levels.

Chloride is toxic to most freshwater organisms, so elevated concentrations can have major impacts on aquatic flora and fauna. Even at levels that are not completely toxic, it can prompt changes in plant and animal communities, favoring chloride-tolerant species like cattails and bullfrogs over most other species. But because road salt plays an important role in transportation safety and its alternatives are costly, its use is unlikely to be curtailed. Consequently, high chloride concentrations may hamper the success of conservation projects.

### TOP TO BOTTOM

AMERICAN BULLFROG © M. JEFFORDS  
COMMON CATTAIL © P. MARCUM

## Development, Recreation, and Habitat Restoration Activities

Construction of roads, parking lots, walkways, picnic shelters, restrooms, tennis courts, ball diamonds, model airplane fields, campgrounds, canoe launches, underground utilities, and other development projects all include at least some degree of ground disturbance. These activities have the potential to destroy natural habitats and archaeological sites.

Many relatively passive uses of FPCC lands also have the potential to disturb archaeological sites and damage natural habitats. Activities such as horseback riding, mountain biking, and even hiking can disturb the upper layers of archaeological deposits. These activities sometimes damage plant communities and increase damaging erosion. Continual use of access points for fishing and boating along the banks of rivers and lakes can disturb the upper layers of archaeological deposits as well.

Habitat and landscape restoration activities such as invasive species removal, burning, dam removal, trail repair, and historic dump clean-up sometimes cause direct ground disturbance to archaeological sites. Sometimes they can actually enhance the preservation of sites by lessening secondary issues of erosion or flooding. Clearing invasive species vegetation on archaeological sites can make the area more visible to the public and less attractive to potential looters.



**GROUND DISTURBANCE**  
FROM DEVELOPMENT, RECREATION, AND  
HABITAT RESTORATION ACTIVITIES MAY DAMAGE OR  
DESTROY NATURAL HABITATS AND ARCHAEOLOGICAL SITES

Appropriate planning and consultation can help minimize damage from development, recreation, and habitat restoration. Forest Preserves staff responsible for construction or recreational projects should work with natural resource managers to determine if proposed locations are compatible with habitat management goals. Systematic archaeological investigation of all proposed development areas should be completed well in advance of setting project budget and construction schedules so development projects can be redesigned if needed to protect important archaeological sites. Forest Preserves staff should also consult professional archaeologists regarding appropriate placement of future recreational facilities and monitor

impacts from existing facilities to reduce the unintended destruction of archaeological sites. Natural and cultural resource preservation efforts should be coordinated to ensure that the needs of both resource types are met successfully.

A fundamental challenge is that, as a general rule, archaeological sites on the Forest Preserves are poorly known. We know that most of the FPCC land holdings coincide with landscapes that were often the most desired spots for human settlement and use throughout the past 10,000 years, yet approximately 80 percent of FPCC lands have never been systematically investigated by professional archaeologists. There is no doubt that FPCC lands contain hundreds of as yet undiscovered archaeological

sites. Even the 550 known sites are poorly understood because less than one quarter of them have been investigated in any systematic way by professional archaeologists. This lack of knowledge hinders planning and makes it hard to protect cultural resources. The Forest Preserves should support systematic archaeological surveys of the forest preserves and evaluation of known sites.

**LEFT TO RIGHT**

RECREATIONAL TRAIL DAMAGE © C. BENDA

TRASH IN FOREST PRESERVE © C. BENDA

GARLIC MUSTARD, AN INVASIVE SPECIES © D. BUSEMEYER



## Climate Change

Climate change is a term we hear about in the news frequently because it threatens the quality of life for humans and the survival of many plants and animals. Climate change refers to major changes in temperature, precipitation, wind patterns, and other effects that happen over time. These changes result in more variable and extreme climate events. For example, many places worldwide have seen changes in rainfall, in some places leading to more floods or droughts, while in other areas causing wetter winters or drier summers. Changes in temperatures may lead to more frequent and severe summer heat waves or earlier springs.

Climate change affects the entire world, but will also affect plants and animals found in Cook County. Climatologists, the scientists who study climate change, are predicting warmer conditions for the Chicago region. The extensive urbanization and industrialization of Cook County creates a heat island effect that increases this likelihood. The warming has the real potential to create a number of environmental issues within the forest preserves, including increased insect pests, lowered water tables in critical wetlands and other natural areas, and reduced opportunities for water-based recreation. Climate change also affects plants and insects such as bees and butterflies that pollinate them. An earlier onset of spring may cause plants to bloom before the bees and butterflies emerge, harming both the plants and the insects.

Climatologists also predict more extreme weather in the Chicago region. Increased frequency and intensity of “abnormal weather events” have already been documented in Cook County and their impacts have been observed within some of the forest preserves. The immediate impacts are caused by single storm events, multiple catastrophic weather events within a single storm event (for example wind shear along with extreme rainfall), or a prolonged, above normal, seasonal accumulation of weather events such as floods or extreme temperatures. Other potential impacts based on current climate change projections may occur gradually, such as hydrological changes over specific areas of the county where rare natural communities occur.

Heavy rainfall events (more than 2 inches per day) are projected to increase for Chicago by 20 percent over the next few decades and are twice as frequent in the Midwest as they were 100 years ago. Increased flooding and faster runoff of stormwater will impact the plants and animals in the forest preserves. In a few cases, prolonged flooding may briefly reduce numbers of some exotic plants by “drowning” them. This is usually only a temporary reprieve and the flooding also damages the native plants that can often tolerate only short-term flooding.

Soil erosion from rapid runoff is increasingly causing damage to wetlands, flatwoods, forested ravines, and floodplain forests. Erosion is aggravated in many forest preserves by previous ditching activities, improper diversion of stormwater (both on and off site), and off-trail abuse by visitors. Forest preserves where erosion was noted this year included Allison Woods, Bachelor Grove, Bunker Hill, Camp Pine Woods, Cap Sauers Holding, Che-Che-Pin-Qua Woods, Dan Ryan Woods, Deer Grove, Green Lake, McClaughrey Spring Woods, National Grove, Paddock Woods, Paw Paw Woods, Pioneer Woods, Red Gate Woods, Salt Creek Woods, Sand Ridge, Sauk Trail Woods, Sidney Yates Flatwoods, Swallow Cliff Woods, Sweet Woods, Thatcher Woods, Tinley Creek Woods, Watersmeet Woods, and Yankee Woods.

In some cases, natural groundwater-fed wetlands like seeps, sedge meadows, and fens have blowouts within the organic soil they grow on due to extreme water pressure caused by the rain events. These blowouts then lower water levels within the wetland, causing drier conditions. This invites the invasion of shrubs and exotic plants and reduces the natural quality and diversity of the natural area.

Severe wind events that damage forested natural areas, from either local storm wind shearing or from more widespread derecho storms with straight-line winds, are becoming a more common occurrence in Illinois. Either wind event may cause extensive areas of uprooting of canopy trees in saturated soils or the snapping of tree trunks and branches. This was noted in the Sand Ridge and Green Lake Woods preserves this year. This disturbance often is followed by increased growth of exotic shrubs and herbs taking advantage of the light gaps.

Native plant and animal species that cannot survive these new conditions will be lost from the region. For example, tree swallows, Baltimore orioles, and American goldfinches are among the 44 bird species that may no longer breed in Illinois by the end of the century, according to Chicago Wilderness. Other plants and animals may survive but become rarer as their habitats become more restricted. Efforts to slow or reverse climate change by reducing dependence on fossil fuels will be important to preserve biodiversity in Cook County, as will managing the forest preserves in ways that promote their resilience under changing conditions. It will be increasingly important to preserve a diversity of habitats that are interconnected so plants and animals can find locations that meet their needs.



**SOME BIRD SPECIES**  
MAY NO LONGER BREED IN ILLINOIS BY THE  
END OF THE CENTURY DUE TO CLIMATE CHANGE



SECTION

# 6

## Integrated Administrative Management

A number of process-related challenges were identified in the engagement process as barriers to achieving the goals of the Natural and Cultural Resources Master Plan. They included issues such as conservation planning, monitoring management outcomes, information management, communication, restoration policy development, and education and training. Here we provide recommendations to address each of these issues.

# Conservation Planning



Natural and cultural resource managers must make a variety of decisions in their day-to-day work managing endangered or threatened species, archaeological sites, natural areas, and landscapes. Some of these resources are protected by laws. Sometimes the management of one resource conflicts with the management of another resource. Sometimes a manager has limited time, money, or equipment, and must decide where to invest these resources.

Many factors may contribute to any decision, and it is not reasonable for resource users or constituent groups to believe they should be able to predict precisely what decision will ultimately be made. However, it is reasonable for taxpayers to ask what issues will be considered in making a decision and gain some understanding of the relative priority that will be given to each consideration. For example, will a federally endangered species be given more consideration than a Species in Greatest Need of Conservation? The former has strong federal laws and requirements for protection, while the latter has none. If you must choose between protecting a Native American burial site and managing an INAI-quality natural community, both of which have strong legal protections, what considerations and processes need to be followed in making the final decision?

A process called structured decision making has been developed to identify the considerations that must be weighed when making a decision and to help prioritize among them. Employing a structured decision-making process provides the public with confidence that the best available information will be used in making a decision. While it may not allow the public to predict the outcome of any one decision, it should narrow the number of reasonable decisions that might be made.

Structured decision making must take into consideration several categories of “objectives,” and “limiting factors” that constrain the breadth of actions that may be taken. At a workshop including FPCC staff, stakeholder representatives, and Prairie Research Institute staff, foundational objectives, outcome objectives, means objectives, and limiting factors were identified for resource management decisions to be made for the forest preserves. Foundational objectives articulate conservation targets or goals, outcome objectives identify future desirable conditions, means objectives define activities that need to be taken to achieve other objectives, and limiting factors are constraints that could limit the likelihood of achieving objectives.

The objectives and limiting factors identified during the workshop are listed on pages 86–87. The order of items within each list does not necessarily reflect their priority. It is clear from these lists that making any management decision is a complex process requiring consideration of a wide range of factors. These objectives and limiting factors were used to identify which lands this Master Plan would recommend as priorities for initial restoration (see Section 7, *Integrated Resource Management*). This list of objectives and limiting factors can also be used as a checklist to ensure that the full spectrum of objects and constraints are considered when choosing any management alternative.



## Foundational Objectives\*

### NATURAL RESOURCE OBJECTIVES

- Persistence of communities composed of native species
- Sites containing dedicated Illinois Nature Preserves or registered Illinois Land and Water Reserves
- Eventual restoration to INAI Natural Area quality, meeting Next Century Conservation Plan goals
- Endemicity and Rarity
  - Globally imperiled species
  - Federal threatened or endangered species
  - State threatened or endangered species
  - Species in Greatest Need of Conservation as listed in the Illinois Comprehensive Wildlife Action Plan and Strategy
  - Chicago Wilderness Species of Conservation Concern
- Sites with legal commitments (mitigation site, contractual or grant obligations)
- Vulnerable Species Groups or Guilds
  - Mussels
  - Amphibians and reptiles
  - Upland woodland plants
  - Birds (wetland, especially marsh; grassland and shrubland; and neotropical migrants)
  - Prairie invertebrates

### CULTURAL RESOURCE OBJECTIVES

- Archaeological sites
  - Human burials
  - Integrity
  - Rarity and uniqueness
  - Age
- Suites of archaeological sites
  - Representing a range of activities (village, gardens, etc.)
  - Integrity
  - Rarity
  - Age
- Archaeological landscapes
  - Historic (e.g., designed landscapes, military-related activities)
  - Representativeness of prehistoric or early historic times
  - Sense of place
  - Landscapes that have repeatedly appealed to people

### LAND ACQUISITION OBJECTIVES

- Low cost
- High intrinsic resource quality
- High restoration potential
- Manageable boundaries
- Watershed protection and position
- High connectivity
- Large size with low edge
- Proximity to existing holdings
- High public use potential
- High educational potential
- Availability
- Current conservation status or public ownership
- Potential for collaboration with other conservation landowners

## Outcome Objectives\*

### NATURAL RESOURCE OBJECTIVES

- Halt further extirpations of native species
- Preserve or restore ecological function
- Maintain existing high quality communities, and increase quality of other communities
- Maintain healthy populations of all species
- Nested species/community restoration objectives within sites
- Promote long-term sustainability
- Maximize return on investment by considering ease of restoration; e.g., prairies and savannas may be easier than fens, remnants may be easier than reconstructions
- Emphasize large sites because of species/area curve, area-sensitive species, and greater resilience
- Stabilize soil organic matter in the context of restoration
- Buffer restorations
- Allow public to experience natural sites in compatible ways
- Adjacency to transportation a necessity
- Prioritize restoration of sites with potentially high visitorship
- Prioritize restoration of sites with high community buy-in
- Retrofit public use areas for nature experience (e.g., butterfly gardens)

### CULTURAL RESOURCE OBJECTIVES

- Sites stabilized professionally where necessary
- Curated artifacts
- Do no harm
- Integrated natural and cultural recovery objectives within sites

\*NOTE: THE ORDER OF ITEMS WITHIN A LIST DOES NOT NECESSARILY REFLECT THEIR PRIORITY.

## Means Objectives\*

- Retrofit forest preserves for hydrologic management
- Build constituency for forest preserves
- Increase use of prescribed fire
- Manage overabundant wildlife, especially deer
- Expand public engagement on purposes of forest preserves
- Stop looting
- Continue guided reintroductions (need to develop policy)
- Engage artifact collectors
- Provide cultural education for law enforcement
- Reduce plant and animal collecting and poaching
- Reduce erosion
- Manage recreational pressure (mountain bikes, unofficial trails, etc.)
- Conduct archaeological survey of 100 percent of FPCC's holdings
- Restore natural history for cultural reasons
- Integrate natural and cultural resource objectives and interpretation

## Limiting Factors\*

- Financial and human resources
- Financial return on investment
- Sustainability
- Politics
- Populism
- Opportunity
- Personnel
- Data limitations
- Knowledge of hydrologic needs of natural communities and ambient water balance
- Coordination of ecological and hydrological restoration
- Clearly articulated and accepted management policies
- Climate change
- Habitat fragmentation
- Legal and regulatory requirements
- Time
- Area/resources relationship
- Availability of contractors
- Number of burn crews
- Plant material availability
- Seed sources
- Contracting process-partners
- Lost opportunities
- Urgency
- Trust equation (landowners/managers/volunteers)
- Logistics of partnering (demands on staff time)
- Baseline knowledge and consensus on path
- Public perception
- Law enforcement limitations

FRESHWATER MUSSEL DIVERSITY © INHS



# Monitoring Management Outcomes

Monitoring resources and management-related outcomes is probably the area where most resource agencies fall short, but doing so is a critical step in an adaptive management cycle. Adaptive management allows changes in management approaches based on outcomes of previous management actions, thereby constantly

improving outcomes. The FPCC has a long history of monitoring resources and outcomes, but the experience of PRI staff gathering information for this plan demonstrated that the data often are not kept in ways that allow easy access and analysis, hindering adaptive management. Comments from FPCC staff corroborated this observation.

We recommend that the Forest Preserves apply information technology management solutions to streamline the development of resource management plans; schedule management actions, whether to be undertaken by FPCC staff, volunteer stewards, or contractors; and record outcomes associated with those actions.

# Information Management

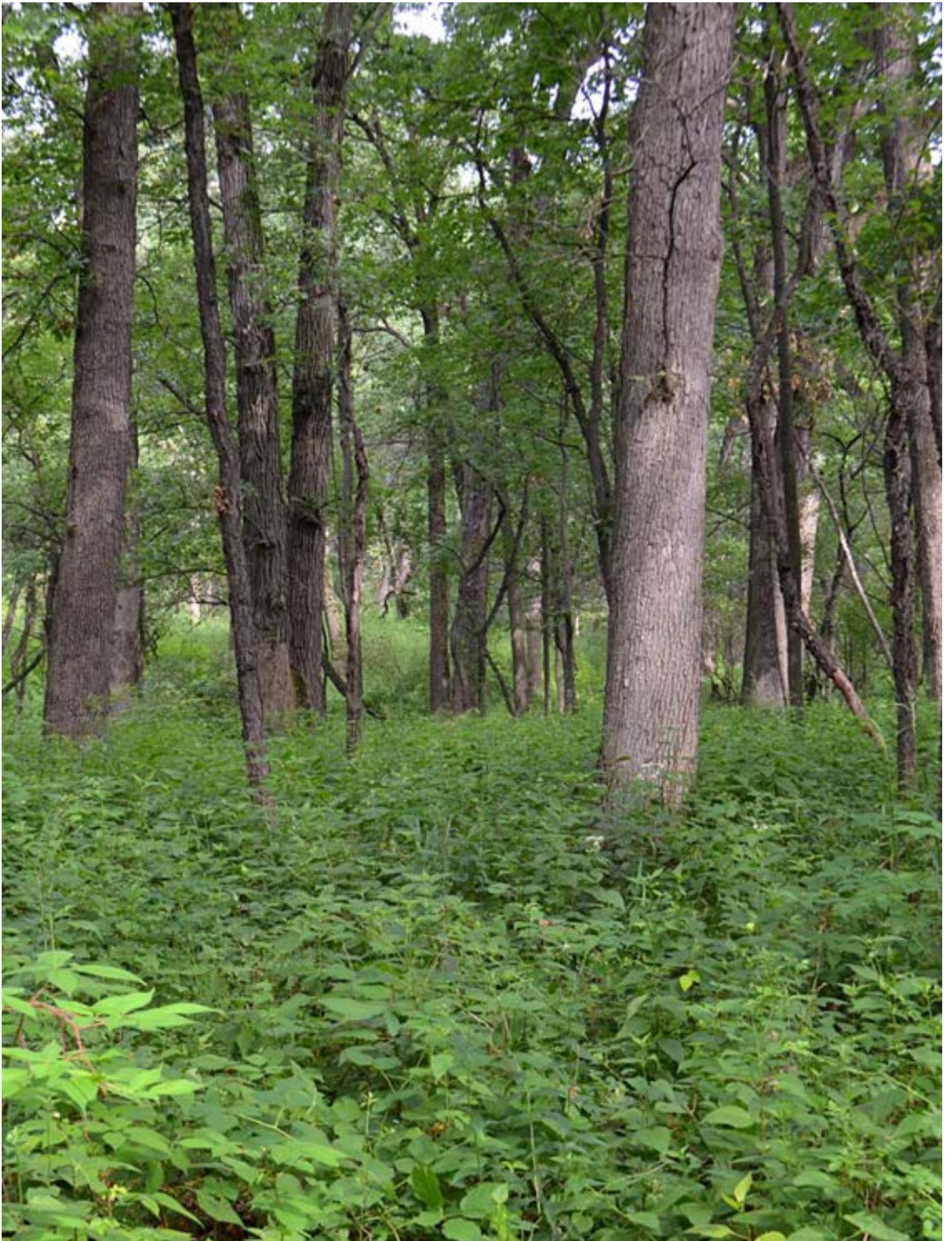
The Forest Preserves staff interviews identified that paperwork consumes a significant amount of time that could otherwise be committed to resource management. This paperwork includes time reporting, vehicle management, work planning, site planning, scheduling, etc. There is a need to develop and implement new technology-assisted workflows which capitalize on emerging technologies. This would allow staff to comply with administrative mandates more quickly and efficiently and would also provide an enhanced capacity for numerically tracking human and financial resource allocations to natural and cultural resource management activities.

In response to the 2011 Desk Audit, the FPCC is developing a technology-assisted time-keeping system and implementing a staff intranet. We recommend that this initiative expand into other administrative workflows such as vehicle reporting and equipment inventory, and eventually into conservation mission workflows such as site resource planning. This could then feed into staff work plans, volunteer management systems, and stewardship contracting.

The resource planning objectives for forest preserve lands, the management actions planned and taken, and the outcomes associated with those actions should all be recorded and made available to staff and stewards electronically. This would ensure a shared understanding of the long- and short-term restoration objectives. It would also construct a management history that can inform and refine management practices. There are several such Conservation Enterprise Data Systems currently

available or under development across the nation that could be customized for the Forest Preserves of Cook County.





# Communication

It is not unusual for any organization to identify inter-unit communication as a weakness that should be addressed. Communication can always be improved, but discussions with FPCC staff suggest that there is a significant need to enhance communication between units. Given the number of sites and facilities housing staff within the FPCC, we suggest the development and deployment of several interlocking communication strategies that could be initiated through the staff intranet under development in response to the 2011 Desk Audit. Notes from routine inter-unit meetings could be posted on the staff intranet, and monthly summaries of unit achievements and future plans could also be made available by providing intranet links via e-mails to all staff. Monthly reports could be used to identify potential content for the FPCC's public website, newsletters, etc. This principle of "re-deployment" of updates can minimize the actual time committed by administrators in update preparation, while maximizing the reach of that information. With enhanced information available on the staff intranet, it will then become the responsibility of individual staff to keep themselves informed.

The engagement process also clearly identified tensions and rifts among FPCC resource managers, volunteer stewards, and conservation partners. All parties acknowledged improved relations over the past several years, but many cited ongoing tensions. Given the ambitious goals of the Next Century Conservation Plan for the Forest Preserves of Cook County (see Section 7, *Integrated Resource Management*) they will not be achievable without expanded commitments and cooperation among FPCC staff, stewards, volunteers, and partners.

One of the challenges in improving relationships between professional staff and stewards will be promoting a culture of mutual respect. The successional demographics are such that most staff positions are being filled by early- and mid-career professionals. The stewards, on the other hand, are dominated by an aging demographic, with many being retired professionals, some of whom possess in excess of 20 years of hands-on experience in ecological restoration. The professional staff should recognize and take advantage of the applied experience of the stewards, while the stewards should recognize that many of the resource professionals were trained as ecologists, an emerging discipline that was new 20 years ago. These new

professionals are familiar with the most recent literature and analytic techniques, and are experienced in designing large-scale restorations. There is much to be gained by these groups working together, but it will be important to create forums where they can each showcase their strengths and mutually engage in shared problem solving. It is important to encourage FPCC staff, volunteer stewards, and other FPCC partners to work side-by-side in achieving shared successes.

# Policy Development

During staff interviews, public forums, and steward focus groups, many people discussed and expressed confusion over FPCC “policies” on things like use of native seeds, brush pile burning, volunteer prerogatives, etc. Such things clearly lie outside FPCC Board policy and within administrative

policy and procedure. It will be important for the FPCC to continue their efforts to develop policies and procedures with constituent input, and to communicate them clearly in a publicly accessible location on the FPCC website. At the same time, it is important that stewards and constituents willingly engage in

policy development, educate themselves about the FPCC’s policies, and abide by them in their actions.

BIG BLUESTEM, A PRAIRIE GRASS © P. MARCUM 

# Education and Training

There are a variety of potential opportunities for both staff and volunteer training across a broad spectrum of natural and cultural resource issues. Natural resource subjects could include restoration best-management practices and specialized training on the identification and biology of specific groups of organisms. It was clear during

the engagement process that most staff and volunteers know little about the types of archaeological sites present on the forest preserves, the information they contain, their locations, threats to this resource, or possible ways to report or minimize damage to archaeological sites. Training could be delivered by staff of the FPCC, Prairie Research Institute,

Illinois Department of Natural Resources, or of any number of Chicago Wilderness partners. An aggressive training regime would also increase the potential for recruitment of early career professionals as volunteers and benefit new FPCC employees.

CIMBY VOLUNTEER TRAINING © FPCC 









SECTION

# Integrated Resource Management

This Natural and Cultural Resources Master Plan for the Forest Preserves of Cook County is designed to achieve the Forest Preserves' mission of conserving natural and cultural resources while promoting compatible education and recreation. It is also designed to achieve the relevant goals of the Next Century Conservation Plan, which are to:

- *Restore 30,000 acres to good ecological health.*
  - *...increase the number of acres in Illinois Nature Preserves and Land and Water Reserves to 10,000 acres by 2015 and 20,000 acres by 2025.*
  - *At least 30,000 acres will reach Illinois Natural Areas Inventory quality.*
  - *Healthy, transitional natural areas will account for most of the remaining 60,000 acres in the preserves.*
- *Expand the preserves to 90,000 acres.*

Cultural resource objectives were not directly addressed in the Next Century Conservation Plan. However, from its inception, the FPCC expressed a strong commitment to the protection, interpretation, and enjoyment of historic and prehistoric sites and artifacts on the preserves.

# Recommendations for Conservation Design

Sometimes threatened and endangered species and other species at risk are found “nested” in high quality natural communities, or natural areas. Sometimes they occur in degraded natural communities. Those that occur in high quality natural areas are usually more resilient to threats, so one approach to endangered species management is to restore the degraded community in which they live. High quality natural areas often are more resilient when surrounded by *buffers*, lands of lower natural quality that physically buffer the effects of development, stormwater, noise, or other human impacts. Archaeological sites can also be nested in natural areas and their management must be factored into a conservation design.

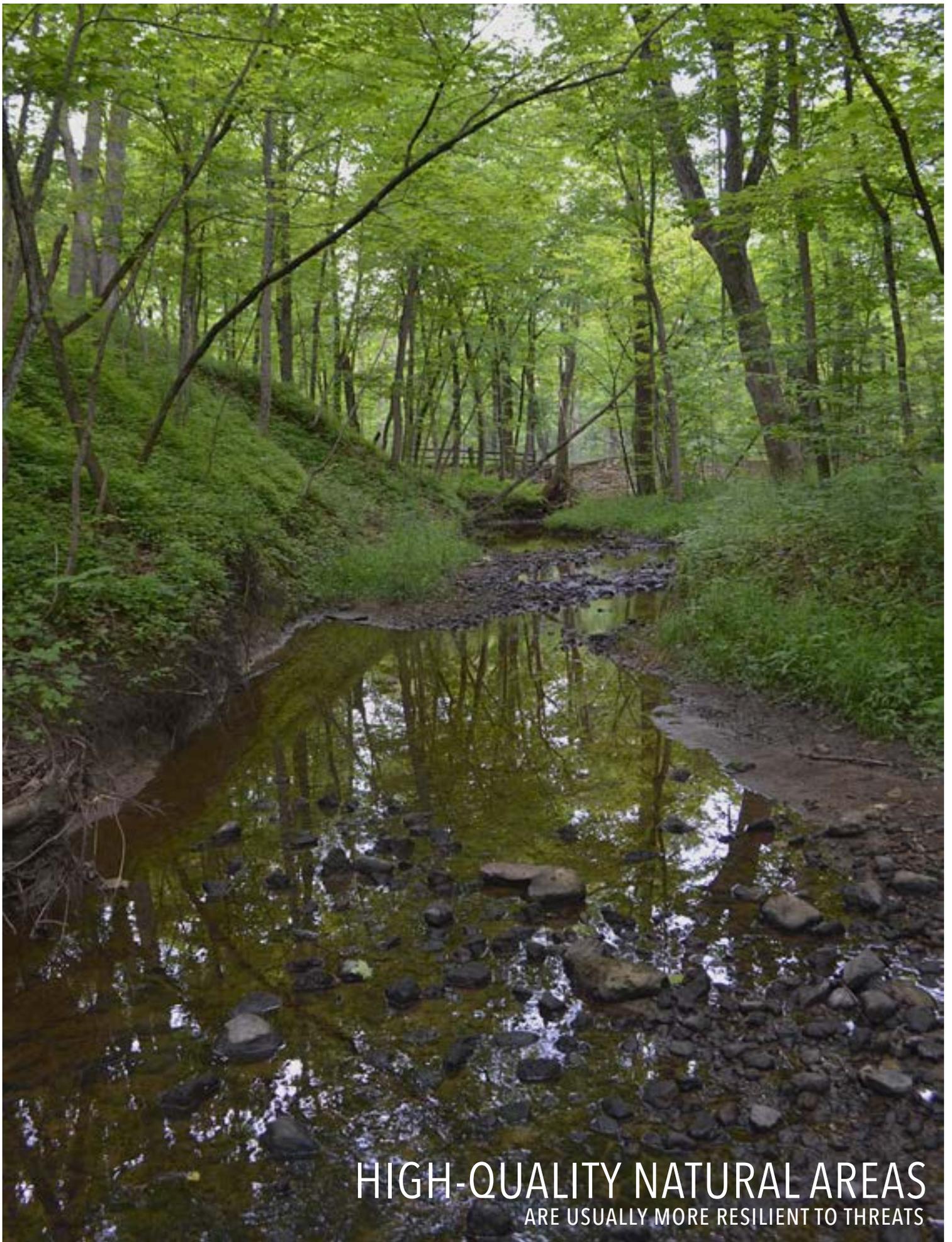
As discussed in Section 5, *Natural and Cultural Resources Threats and Needs*, habitat fragmentation is a major conservation issue. Consequently, connecting preserves by grouping them and restoring corridors among them is an important consideration in natural resource conservation. Connectivity can also be important in the archaeological context because early peoples also used different natural community types and constructed related sites in a variety of places, for example a village and its associated gardens, agricultural fields, hunting and fishing areas, and burial grounds. Thus archaeological sites may occur in complexes that define landscapes used by humans.

Cook County’s intense urbanization makes it impossible to provide habitat corridors or connections between all the forest preserves in Cook County. However, many of the benefits of connectivity could be achieved by focusing on consolidating lands areas where concentrations of forest preserves already exist. Attention should also be given to areas identified in the Chicago Wilderness Green Infrastructure Vision.

Although most of these lands are not likely to become part of the Forest Preserves, they present opportunities for cooperative management that would increase their habitat quality. In this way they could provide corridors connecting nearby forest preserves. By acquiring land and restoring linkages among existing forest preserves, many of the benefits of connectivity are still achievable.

A *conservation design* is a plan that identifies where important species, natural areas, and significant cultural resources are located; designs buffers for natural and cultural resource areas; identifies areas to be restored for the rare species or to be managed to preserve the cultural resources; looks for opportunities to connect conservation lands with corridors or linkages; and ensures that natural communities of all types are preserved close enough to each other to allow animals that need to move from one to another during different stages in their lives can do so. Like all conservation decision-making, developing a conservation design involves compromises between competing goals, but aims to maximize the likelihood

of achieving those goals considered most important. Computer mapping tools called Geographic Information Systems (GIS) are invaluable in mapping the occurrences of threatened and endangered or other rare species and the locations of archaeological or other cultural sites; overlying the boundaries of natural areas and cultural resource areas; and identifying potential buffer areas, connectivity opportunities, areas for passive recreation (hiking or birding), and areas for compatible active recreation, such as biking, boating, or picnicking. Plans that include conservation designs that provide connectivity between many preserves or natural areas across a large region like Cook County are called “Landscape Conservation Designs.”



**HIGH-QUALITY NATURAL AREAS**  
ARE USUALLY MORE RESILIENT TO THREATS

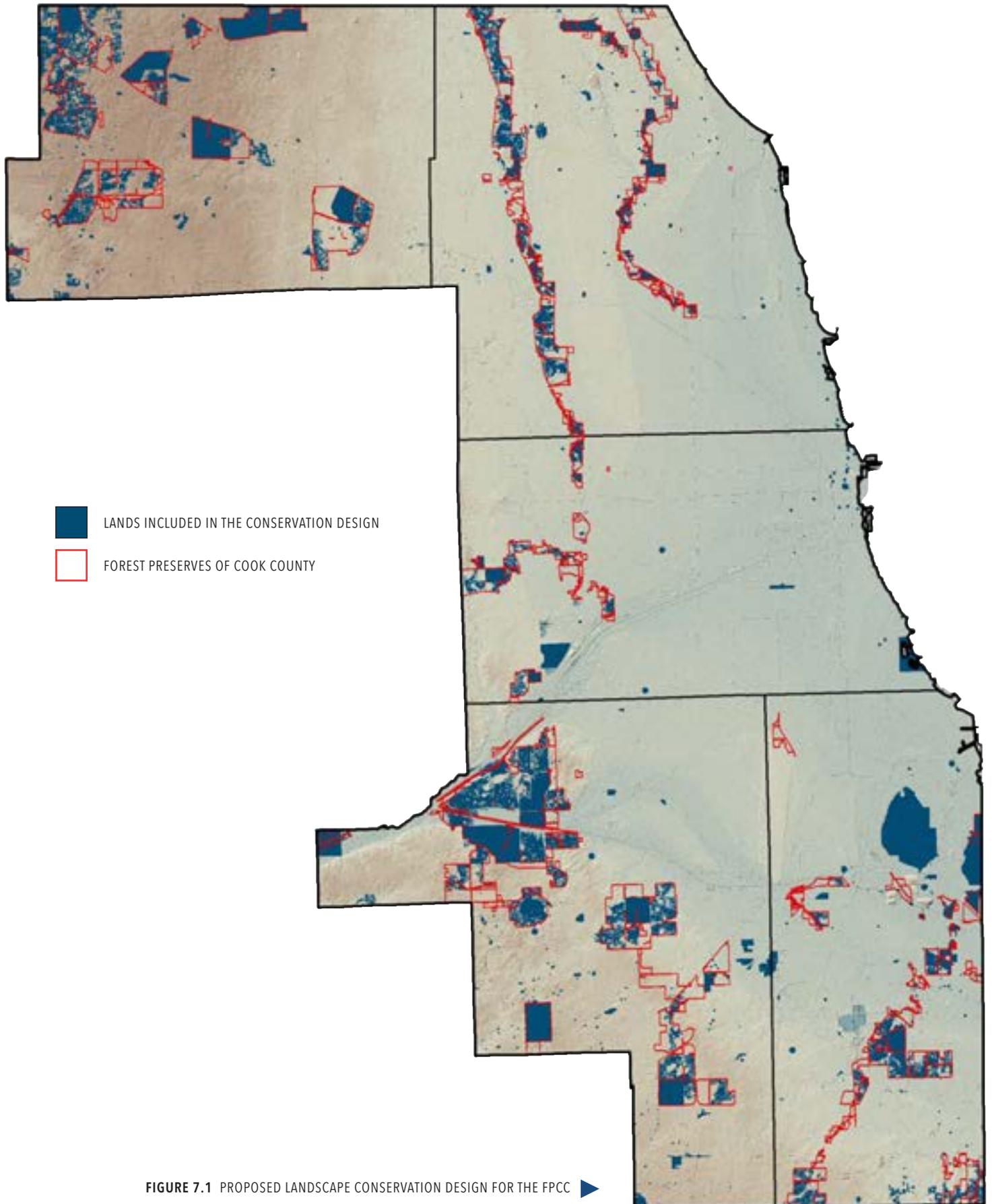


FIGURE 7.1 PROPOSED LANDSCAPE CONSERVATION DESIGN FOR THE FPCC ►

## Footprint for a Landscape Conservation Design

To achieve the Forest Preserves' mission and the Next Century Conservation Plan vision, this Master Plan recommends a Landscape Conservation Design that integrates public and private resource conservation efforts across Cook County and into neighboring counties. Major components of the design include Illinois Natural Areas, Illinois Land and Water Reserves, Landscapes of Ecological Integrity, areas with significant cultural resources, and areas of natural vegetation that can provide corridors and linkages among these conservation lands.

One of the principal criteria for dedicating property as an Illinois Nature Preserve is the presence of an Illinois Natural Areas Inventory (INAI) Natural Area. Detailed methodologies exist for grading natural area quality. Grades A and B are considered Illinois Natural Areas Inventory quality; grade C lands can be restored to natural area quality. Illinois Nature Preserves can also be dedicated to protect federally or state listed endangered or threatened species and their habitats, or archaeological resources of statewide significance. Statewide inventories are available for such resources.

The Illinois Register of Land and Water Reserves was designed to protect the same categories of resources as Nature Preserves, but in addition to protect area-sensitive species, large concentrations of wildlife (like heron rookeries or mussel beds), and restorations of natural communities for which no high quality examples exist. Registered lands usually must also be grade C natural quality.

In 2013 the Illinois Natural History Survey conducted an Inventory of Landscapes of Ecological Integrity (LEIs) that identified tracts of land supporting natural vegetation; in other words, undeveloped lands that were of a size and shape that could meet the minimum acreages and interior size needed to protect area-sensitive species. Other surrogate indicators of potential natural area quality, like the presence of nature preserves or federal or state endangered or threatened species, remoteness from roads and developed areas, or presence of reptilian, amphibian, or avian Species in Greatest Need of Conservation from the Illinois Comprehensive Wildlife Action Plan and Strategy were also employed to discriminate between areas with more or less potential for registration. The LEIs were identified using remote sensing technologies, but those identified as highly restorable in Cook County have been field-surveyed to ensure that they have the potential to support the targeted resources or could be restored to support those resources.

In the course of developing this Master Plan, ISAS staff compiled an inventory of known archaeological sites in Cook County and evaluated their significance, with particular emphasis on those found in the forest preserves. In addition, they used a range of site and landform characteristics to identify other areas likely to hold additional archaeological sites. Although on-the-ground surveys will be necessary to determine if sites are actually present in these locations, those with high potential should be included within the landscape conservation footprint along with sites of known significant cultural resources.

The Illinois Land Cover Map can be used to identify areas of natural vegetation that could provide corridors and linkages between complexes of conservation lands. Using a Geographic Information System, maps of these resources can be overlaid to produce the potential footprint of a Landscape Conservation Design for Cook County (Figure 7.1). This footprint includes both public and private conservation lands, and lands that might be acquired for conservation purposes. The lands in this design currently support natural resources of significance. The total acreage of lands in the design currently protected within the forest preserves system is 34,830 acres, with 13,438 acres not under the Forest Preserves ownership at this time. To enhance connectivity and consolidate ownership in some regions, smaller, more degraded tracts of undeveloped lands may also have to be acquired. Just over 37,000 acres of undeveloped lands remain in Cook County outside the Forest Preserves' ownership that could contribute to this goal. However, this suggests the goal of having 90,000 acres in the Forest Preserves of Cook County is only possible if land acquisition continues at a very aggressive pace.

# Resource Restoration and Protection Priorities

Because landscape conservation designs include large tracts of lands, it is necessary to prioritize restoration efforts on smaller units that are part of the design. We refer here to these smaller units as “management units.” Management units may contain a single resource of significance, an endangered species, or an archaeological site, often referred to as “significant features.” Priorities are assigned to management units based on the rarity, sensitivity, and potential for restoration of their significant features, and on legal obligations.

Priority for management and restoration follows this hierarchy:

1. Dedicated Nature Preserves and registered Land and Water Reserves
2. Other INAI Natural Areas, including those that are under recommendation
3. Lands currently under management that could be brought to INAI quality relatively quickly
4. LEIs surrounding priority 1–3 sites and judged to have high potential for restoration and registration as Land and Water Reserves
5. Other sites currently under restoration.

Throughout the next century, lands in each of the above categories can be restored from Grade D, to Grade C, to Grade B, and with great effort to Grade A, allowing reclassification for higher levels of protection along the way. This will be the quickest way to achieve the Next Century Conservation Plan’s goal of 30,000 acres restored to Illinois Natural Areas Inventory quality.

Setting priorities for cultural resource protection must consider compliance with state and federal historic preservation laws, as well as general resource stewardship. Locations containing human remains or the potential to contain human remains (prehistoric burials, earthen mounds, unregistered historic family burial plots, registered historic cemeteries), are protected by the Illinois Human Skeletal Remains Protection Act (20 ILCS 3440) and the Native American Graves Protection and Repatriation Act (Pub. L. 101-601, 25 U.S.C. 3001 et seq., 104 Stat. 3048). Associated grave goods are protected under these laws as well. Archaeological sites associated with human remains must be the first priority for resource protection, followed by sites or groups of sites containing well-preserved information about the prehistory or early history of our nation, of northeastern Illinois, or Cook County.

As outlined earlier in this document, very little professional field evaluation of archaeological sites or sensitive landforms has been completed within the forest preserves. All areas affected by planned development or construction, heavy recreational use, and/ or ground disturbing habitat restoration projects constitute a high priority for consideration. These areas, and any archaeological resources they contain, will require systematic evaluation to prevent inadvertent loss of this resource.

As previously discussed, management units may adjoin each other or even be nested within each other. To facilitate integrated resource management, large complexes of adjoining management units from the categories above have been identified as “landscape units.” The landscape units identified here, together with some smaller management units supporting high quality or rare resources, total close to 30,000 acres (Figure 7.2). Collectively they protect the highest quality or most important natural and cultural resources, optimize the return on previous management efforts, and promote landscape connectivity. Based on current knowledge and circumstances, we recommend these lands as restoration priorities to address the goal of the Next Century Conservation Plan to restore 30,000 acres to Illinois Natural Areas Inventory quality.

Staff from the PRI and FPCC have collaborated to prioritize among the landscape and management units, taking into account information collected during the planning process and the management and restoration hierarchy described above. The top four landscape units are, in priority order, the Palos Complex (the historic Mount Forest Island between the DesPlaines River and Cal-Sag Channel, together with the high ground south of the channel; southwest Cook County), the Jurgensen Complex (Jurgensen, Sweet Woods, Thornton-Lansing, and Wampum Lake preserves; southeast Cook County), Busse Woods (part of Ned Brown Preserve; northwest Cook County), and the Deer Grove preserves (northwest Cook County). Together, these four units account for about 15,000 of the 30,000 acres to be restored to high natural quality.

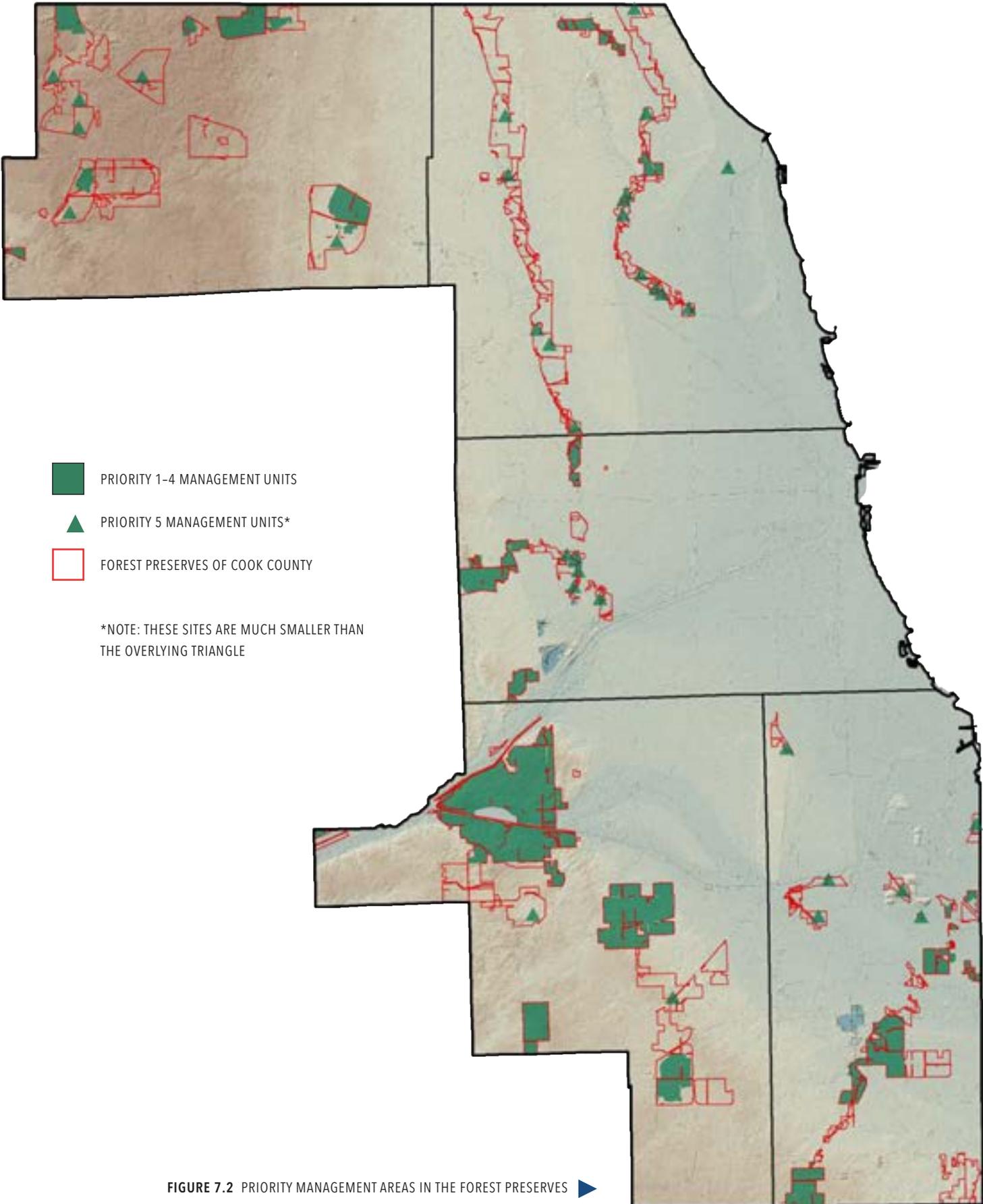


FIGURE 7.2 PRIORITY MANAGEMENT AREAS IN THE FOREST PRESERVES

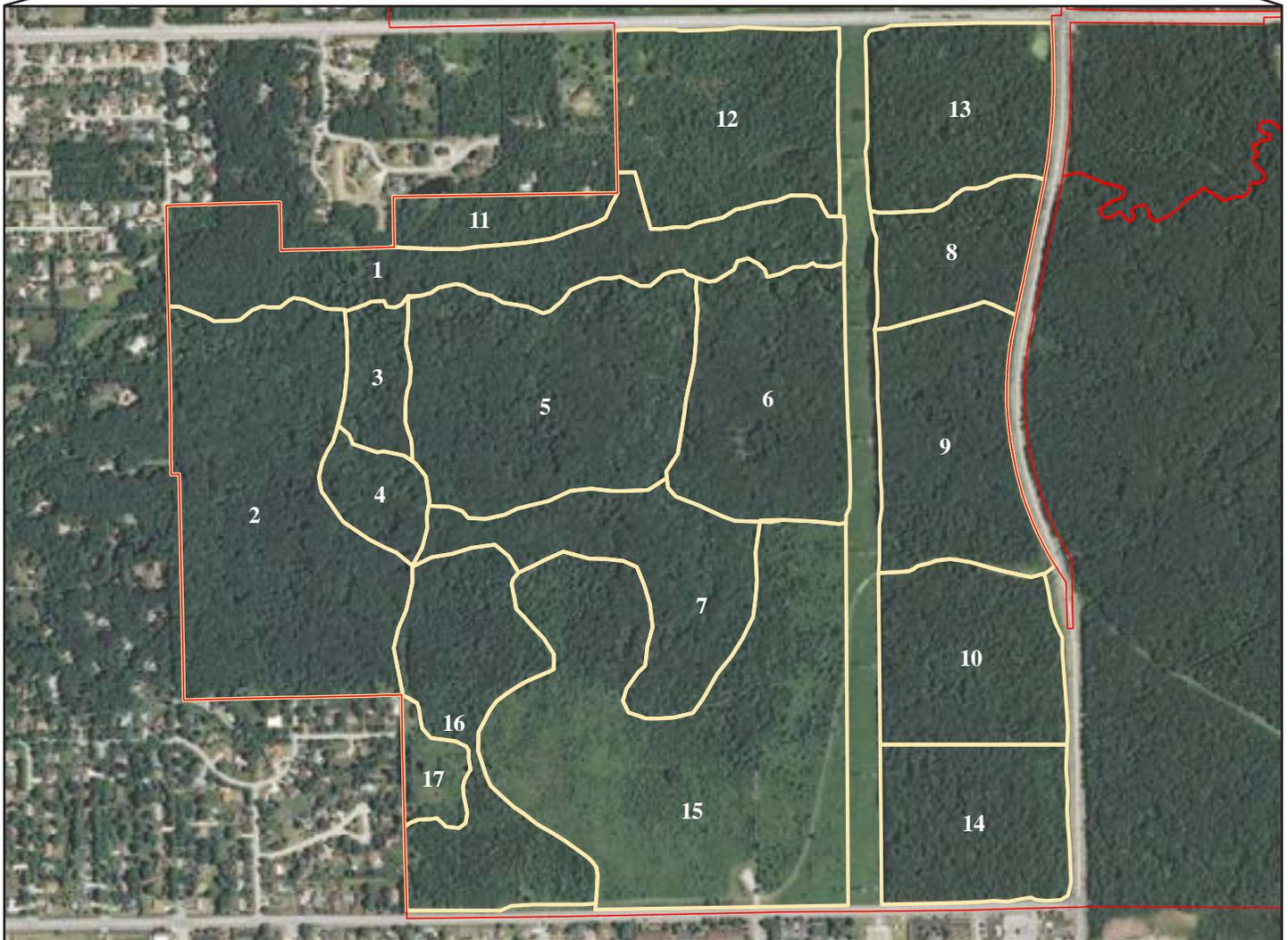
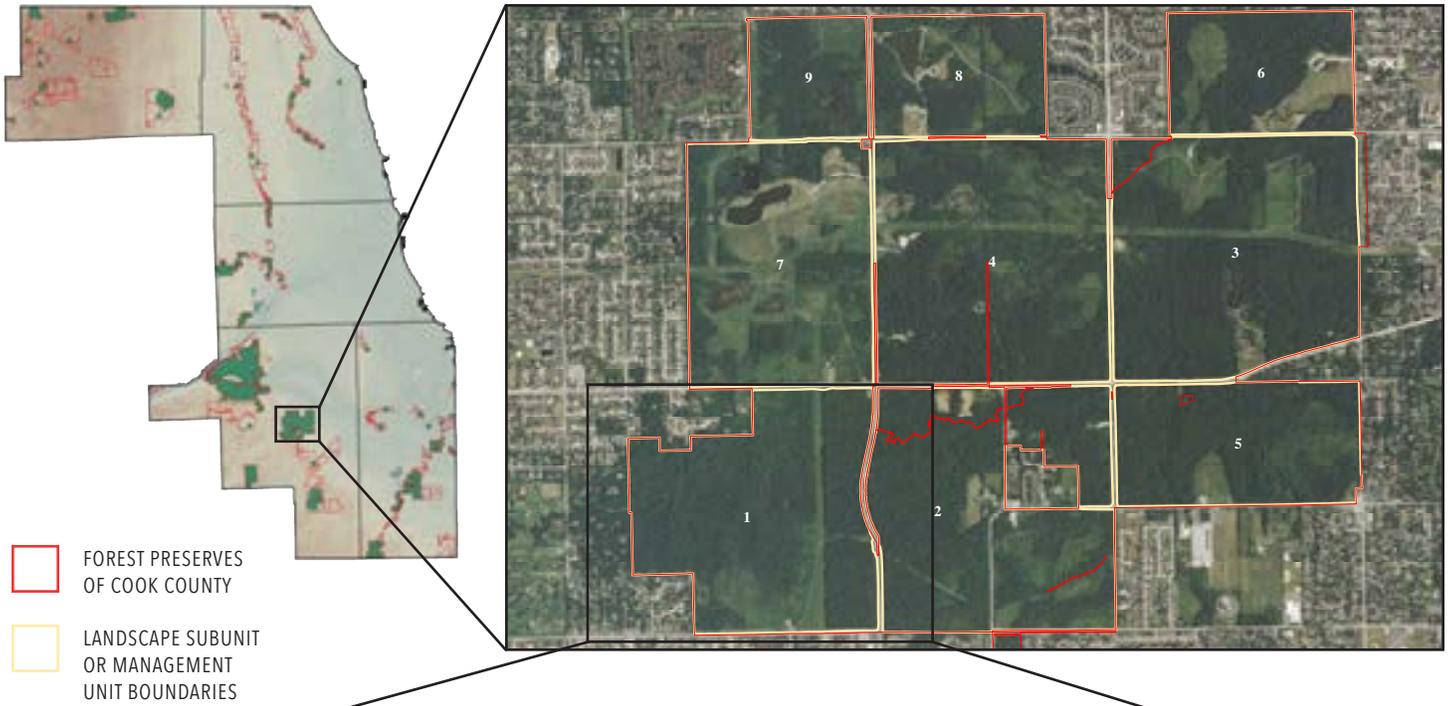


Figure 7.3 illustrates an example of prioritization among management units within a landscape unit, in this case the Tinley Creek Preserves. Using the prioritization scheme described above, the landscape unit is divided into a prioritized set of subunits. Each subunit is then divided into a prioritized set of management units. Specific short- and mid-term restoration goals, and the management tools needed to achieve these goals, are developed for each management unit.

The Forest Preserves initially will focus their efforts on high priority management units across the county. As those sites reach their restoration goals, management activities will shift to maintaining high quality on those units. The focus of more labor-intensive restoration efforts then will be aimed at lower priority management units. Sites that only qualify under priority criterion 5 (“other sites currently under restoration”) will continue to receive attention throughout this process, particularly from volunteers. Volunteers will also have a major role in maintaining other sites that have seen significant improvement through more intensive, usually contract-based, restoration. This approach will ensure that high natural quality will be maintained where it already exists and maximize the likelihood that the entire 30,000 acres reaches high natural quality in the next 25 years.

The Landscape Conservation Design provides a framework for identifying new acquisitions to achieve the Next Century Conservation Plan’s goal of 90,000 acres in the forest preserve system. The Landscape Conservation Design also identifies a significant acreage beyond the 30,000 to be restored to INAI quality that should be restored as “*Healthy, transitional natural areas...*” per the Next Century Conservation Plan.

We recommend that the Forest Preserves identify sites that offer opportunities for compatible recreation, for example mountain biking, horseback riding, and other activities, in a natural setting. The selection process should begin by screening sites for lower conservation value. Archaeological surveys and assessments should then be performed on these sites to insure protection of those that have significant cultural resources. This is not meant to imply that these or other FPCC properties that are not of high conservation potential should be ignored. In fact, the broader vision of the Next Century Conservation Plan demands at least maintaining the natural quality of most of the undeveloped lands owned by the Forest Preserves now and in the future.

**FIGURE 7.3** TINLEY CREEK PRESERVES, SHOWING PRIORITIZED LANDSCAPE SUBUNITS (LEFT ABOVE) AND PRIORITIZED MANAGEMENT UNITS FOR SUBUNIT 1 (LEFT BELOW).

TINLEY CREEK PRESERVES © FPCC





RESOURCES WITHIN THE  
FPCC ARE PRICELESS

# Scale of Human and Financial Resources Needed to Achieve the Mission and Vision



The costs of restoring and maintaining the quality of natural areas can be significant, as can be the costs of identifying and protecting cultural resources. These costs are generally higher in areas where the lands are under pressure from development, heavy use, vandalism, artifact collection, invasive species, and other threats. As this report has demonstrated, all these factors are present in Cook County.

The mix between management undertaken by professional staff, contractual staff, volunteers, and collaborating institutions can also affect total costs. The FPCC has a long history and tradition of utilizing volunteers in site stewardship. These volunteers contribute many thousands of hours annually and significantly further the Forest Preserves' restoration efforts at a number of sites. Their involvement also contributes to public support for the Forest Preserves by exposing people to the vital natural and cultural resources in the preserves. At the same time, there are costs associated with volunteer programs because they require guidance and training to ensure their effectiveness and safety. Meeting management needs through assistance from collaborating institutions (such as local colleges and universities) requires oversight, guidance, project review, and permitting as well.

It is also important to note that contractors are able to complete coarse, large-scale restoration work much more quickly than can volunteers. Forest Preserves staff estimate that in 2014 contractors did restoration work on about 2,000 acres, completing structural restoration on between 300 and 400 acres. However, volunteers are invaluable for conducting fine-scale work for which contractors are inappropriate, developing critical site-level expertise that can inform the Forest Preserves' management efforts, and protecting sites by being "eyes and ears."

The costs of embracing the Next Century Conservation Plan vision of restoring 30,000 acres to high natural quality can be estimated by subtracting the acreage within the Forest Preserves of Cook County that is already at that quality, then multiplying the remaining acreage by the per-acre cost of restoration. Using the Forest Preserves' recent restoration costs, we estimate meeting the Next Century Conservation Plan's goals will cost between \$650 million and \$1.3 billion

over the next 25 years (in current dollars). This includes, but is not limited to, brush clearing, tree removal, prescribed fire, wildlife management, and maintenance of previous work. These are significant investments, but the resources within the Forest Preserves of Cook County are, by any reasonable measure, priceless.

A final caution: these costs relate to natural area restoration and maintenance ONLY. They do not include the costs of properly investigating, protecting, and curating archaeological resources; managing visitors; providing and managing recreation; ensuring public safety; maintaining facilities; or conducting education and outreach, which are all costs associated with the mission of the FPCC.



SECTION

# 8

## Education and Interpretation

When Dwight Perkins began leading “Saturday Afternoon Walking Trips” through Cook County’s natural areas in 1908, he was using educational experiences in nature to establish a strong base of support for the Forest Preserve idea. The walks were rigorous hikes in prospective preserve locations, with scientists and conservationists often giving lectures during meal breaks. These events exposed people to the scenic beauties of the region, to the accessibility of these areas, and to the effects of development. Through this, the Saturday Afternoon Walking Club brought in thousands of new supporters for the forest preserve idea and inspired them to campaign for its creation. These new supporters were instrumental in the passage of the 1913 Forest Preserve Act that allowed for the creation of the forest preserves we enjoy today. This is a potent example of the power of education to aid in achieving ambitious conservation goals.

# Ecological and Historical Literacy

Ecological literacy means having a broad base of information about environmental systems, both past and present. What Americans know about the environment is collected during a person's lifetime from a wide variety of sources including school, museums and other educational facilities, personal experiences, and the media. A 2005 study on environmental literacy found that most Americans have accumulated an assortment of disconnected concepts and opinions from a variety of sources, some unreliable, and that the majority of Americans lack a true, working knowledge of environmental processes or problems. The hallmark of ecological literacy as opposed to ecological awareness is the breadth of knowledge.

For an example of ecological awareness versus ecological literacy, consider the difference between having a basic awareness that rainwater often ends up in rivers and lakes versus understanding the total water cycle, particularly as it relates to one's own region. In the first case, the individual's awareness of this concept is fragmented from the whole process and does not easily lend itself to inspiring environmentally conscious behaviors. In the second case, the environmentally literate person understands the systems that govern where rainwater will end up, and because of this is empowered to consciously choose how to interact with the system.

Historical literacy parallels ecological literacy. Rather than seeing history as a series of distinct, unrelated events, the historically literate person understands how those events are related to each other. To reach that understanding requires knowledge about how past humans of many cultures interacted with each other and with the natural environment, and why the choices they made led to the paths of history. Historical literacy allows individuals to better anticipate the long-term consequences of their decisions and thus to consciously and responsibly choose their behaviors.

As demonstrated in earlier sections of this report, decisions made by ordinary citizens, businesses, and politicians do affect the health of the preserves. A citizenry who are ecologically and historically literate are able to claim ownership of the role they play in the preservation of natural and cultural resources. They are empowered with the ability to better define their relationship with the world around them.

Systematic instruction ensures that citizens have a basic understanding of natural systems and prehistoric or historic events that extends beyond isolated facts or impressions. Integrating environmental and cultural resource education into the school curriculum is one way to build ecological and historical literacy. As recommended by the Next Century Conservation Plan, the Forest Preserves should make sure every town has at least one educator who can train peers to integrate nature and the forest preserves. By incorporating environmental and cultural resource education into the school curriculum, all students can obtain a comprehensive base of information upon which the nature center programming can expand. The preserves already play a large role in developing systematic environmental education. Currently, the FPCC offers science and nature programs tailored for

individual classrooms and that meet the Illinois learning standards. The Mighty Acorns program used by the FPCC is incorporated into class curriculums, and includes hands-on experiences and follow-up activities. The FPCC also offers free field trips and service project opportunities to schools.

The Forest Preserves of Cook County should continue to offer and promote these programs. They should work towards developing new programs that systematically build knowledge of environmental systems and issues. The Forest Preserves can also incorporate cultural resource education into existing programs, as well as develop new programs focused primarily on the archaeological resources present within the preserves. True ecological and historical literacy takes time, but a goal of the Forest Preserves should be ensuring that it is within the reach of every citizen of Cook County.

TOP TO BOTTOM 

HISTORICAL RE-ENACTMENT AT  
SAND RIDGE NATURE CENTER © FPCC

NATURE LESSON AT BARTEL GRASSLAND © FPCC





HUMAN AND NATURAL SYSTEMS  
CANNOT BE CONSIDERED FULLY SEPARATE

# Ecological and Historical Identity

Developing an ecological identity means developing an awareness of one's role within the environment. On a map of Cook County, natural areas end at clearly defined borders. This designation can create the false impression that natural and human ecosystems are entirely discrete entities. Defined natural area borders also mask the reality that many present day "natural areas" were once agricultural fields, developed farmsteads, commercial or industrial properties, roadways, military training grounds, and even prehistoric villages. Humans in urban areas can be led to believe they have little connection to or effects on natural areas. This is not the case. The preserves are the product of a larger, interrelated system that includes urban areas and that is affected by human actions that occur in and outside of the borders of the preserves, both now and in the past. Simply put, human and natural systems are entwined.

Developing an historical identity means developing an understanding how one's own life fits within the scope of history. By teaching about the material culture left behind by the hundreds of generations of people who have lived on this land, archaeology can help people today consider their own material culture and what artifacts or marks on the environment they are leaving behind. This is especially important today, in a time of such colossal human-caused changes to the environment. Learning about local history and prehistory is particularly important, and should continue to be promoted by the FPCC, because it helps people understand that the world of the present and the future is built upon how their own local environment has been utilized by people of the past. Historical identity integrates the place's history into the lives of the people that inhabit that place. It shows them that their choices are part of a larger series of interactions, including those that created the forest preserves.

It is important to note that having an ecological and historical identity is not simply recognizing humankind's negative impacts on the environment. Recognizing our capacity to interact with an ecosystem in a way that is balanced is essential to the health of the environment. Worldwide trends of increasing development and population growth confront us with the fact that human and natural systems cannot be considered fully separate. Nature should not be seen only as a wilderness that must be kept far away from the damaging hands of human civilization, but as a force that thrives whenever and wherever it is used wisely and nurtured.

Cook County, a county of five million people living near 69,000 acres of Forest Preserve property, is uniquely positioned to serve as a model of coexistence between natural and urban areas. On a trajectory of increasing urbanization worldwide, this model could have a global significance. Particularly in an urban setting, environmental education must actively seek to develop an ecological and historical identity among its citizens, as the human-constructed world of urban life can easily obscure that identity and degrade the sense of place. The FPCC can help develop ecological and historical identity in its citizens by providing education that emphasizes the ways humans interact with and benefit from natural areas, both in the distant past and today.

Experiences in the forest preserves play an important role in developing an ecological and historical identity. Local forest preserves put people in contact with their most direct connections to natural and cultural resources. A visit to the Forest Preserves of Cook County can accomplish what a visit to a national park or a wilderness area may not be able to accomplish. The experience of nature or an archaeological site as something that is distant and exotic, or of wilderness as pristine and entirely devoid of human activity, can prevent us from recognizing ourselves as part of the ecosystem. Conversely, the experience of nature and history as things we are surrounded by can help us identify with and value these resources. The Forest Preserves of Cook County provide this important connection for the residents of Cook County. The education and outreach of the Forest Preserves should continue to help people appreciate and identify with local ecosystems. Programming should encourage people to examine how nature and history fit into the context of their own lives.

# Individual and Community Stewardship



Emotional bonds with natural and cultural resources serve as motivation to protect them. These emotional bonds are not apparent in all individuals and must be regarded as something that should be developed through time and through experiences in nature. Scientific facts about nature, without the context of caring, will do little to help the conservation of our natural areas. Facts about artifacts, without an appreciation of what they tell us about Chicago's previous residents, will do little to inspire the protection of archaeological sites. In acknowledging this, education in the forest preserves should seek to create an emotional bond with nature and history and to understand the emotion-driven nature of environmental behaviors.

Many of the FPCC's current education and outreach strategies already promote caring. For example, programs offering direct, hands-on experiences in nature create emotional connections. Environmental educators establish care in students through the contagion of their own enthusiasm. Service opportunities, such as the FPCC's robust volunteer stewardship program, allow people to explore and understand natural processes directly and inspire the strong emotional bond that comes from restoring the land. The Forest Preserves of Cook County should continue to offer existing programs and create new programs that establish an emotional bond between the individual and the preserves.

When it comes to inspiring environmentally conscious behaviors, community is key. The belief that one is not acting alone inspires individuals to make decisions beneficial for the environment. In this way, environmentally

conscious behavior is a social act. Furthermore, sharing experiences with family and close friends amplifies the impact of experiences in nature. The Forest Preserves should continue to foster a sense of community through the use of family programs, community events, and regular communications to the community. The six nature centers situated throughout the county should be seen as centers of community. The Forest Preserves of Cook County is uniquely positioned to bring communities together to work towards shared visions.

Developing ecological and historical literacy, ecological and historical identity, and individual and community stewardship will build the strongest base of citizens who can serve as allies for the Forest Preserves of Cook County. Though some of the terminology presented here is rather recent, the ideas behind them are not and can be seen in the efforts of the founders of the Forest

Preserves of Cook County. The hope is that a comprehensive plan for education and outreach will be created in the future, building on ideas introduced by this report and the Next Century Conservation Plan, and inspired by the FPCC's history of innovative leadership. Environmental education is mobilizing and it can be a catalyst for the next 100 years of conservation in the forest preserves.

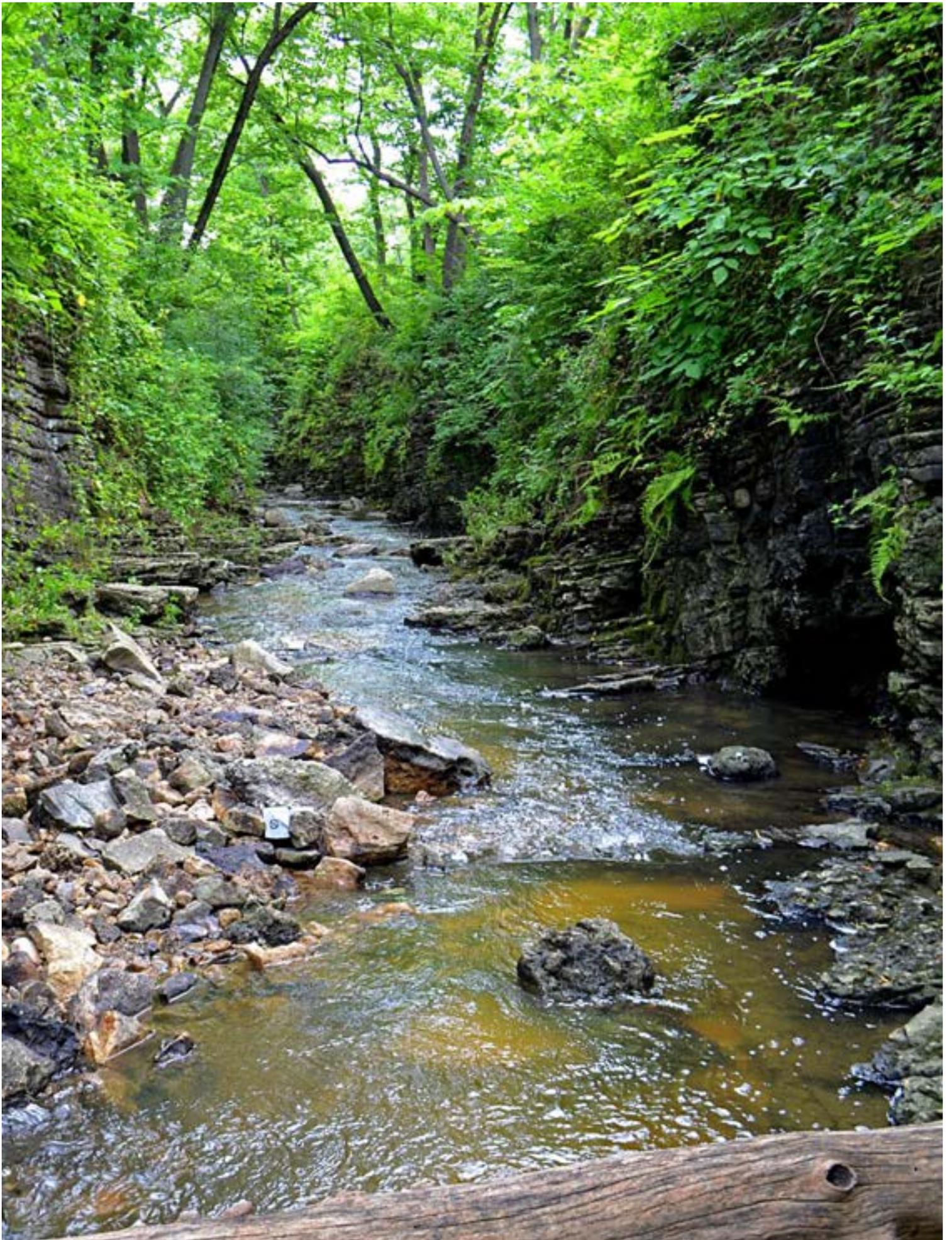


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# Glossary

**ARCHAEOLOGY** the study of the ancient and recent human past by examining the materials humans have made, used, discarded, and built, as well as the landscapes and drainages humans have altered.

**AREA SENSITIVITY** when an animal requires a large amount of space of a single habitat in order to breed.

**BIODIVERSITY** the variety of plant and animal species in their natural environments; also the variety of genes they contain.

**BUFFERS** lands of lower quality that surround an area of important natural or cultural resources, giving it some protection from human impacts, such as fire, development, and noise.

**CONSERVATION DESIGN** a systematic approach to identify the location of important species and natural areas, the areas to be restored for rare species; and opportunities to connect conservation lands with corridors.

**CULTURAL RESOURCES** archaeological sites (e.g., prehistoric villages and campsites, prehistoric burial mounds, pioneer homesteads and cemeteries), architectural resources (e.g., buildings, bridges), transportation routes (e.g., prehistoric trails and portages, historic roads and routes), historic planned landscapes (e.g., gardens, public parks), and traditional cultural properties (e.g., native medicine plant gathering areas, ceremonial grounds).

**DEGRADED NATURAL COMMUNITIES** plant or animal communities that have deteriorated or worsened due to a lack of resources, such as air, water, soil, and food, or disturbance to the environment.

**ECOSYSTEM SERVICES** benefits from ecosystems, such as clean water and air or recreation.

**ENDANGERED SPECIES** species that may become extinct if not protected by laws.

**EXOTIC SPECIES** any species intentionally or accidentally transported and released by humans into an environment outside its native range.

**EXTANT POPULATIONS** populations that are still in existence; still surviving.

**EXTINCT SPECIES** plants or animals that are not found anywhere in the world.

**EXTIRPATE** to wipe out or destroy in a particular region.

**FRAGMENTATION** breaking natural habitats into small areas separated by regions without native species.

**INVASIVE SPECIES** a plant or animal that has a tendency to spread aggressively, displacing other plants or animals.

**NATIVE SPECIES** plants or animals that are naturally part of a given area.

**NATURAL COMMUNITIES** An assemblage of plant species co-existing under similar environmental conditions and natural processes.

**NATURAL RESOURCES** plants, animals, materials, and substances found in nature.

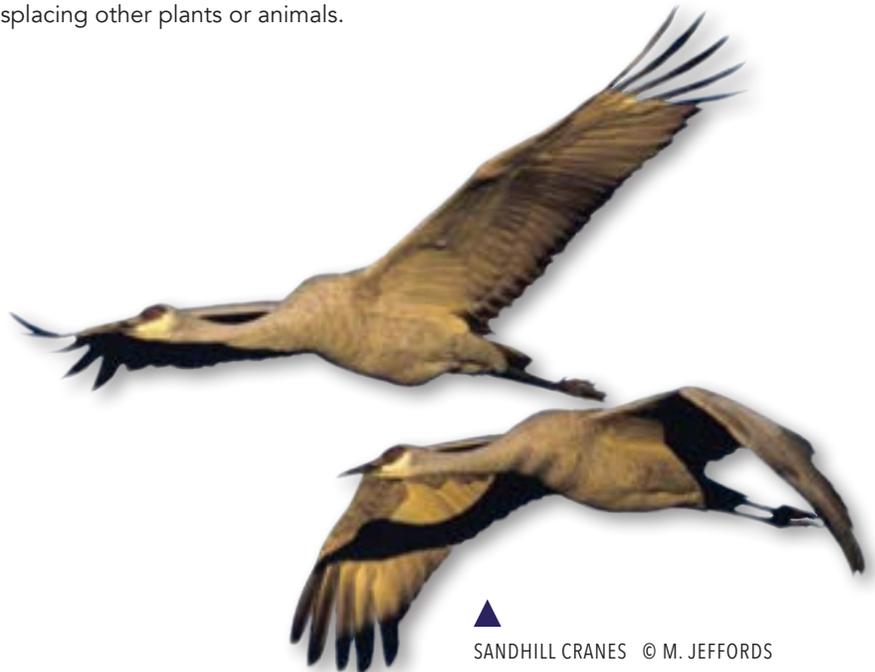
**MORaine** a mass of debris, carried by glaciers, that forms ridges and mounds when deposited

**PREHISTORY** the period before written records. In North America, the prehistoric period generally ends with the entrance of early European explorers and missionaries into the continent.

**REACH** a segment of a stream or river.

**SAVANNA** a natural community consisting of grassland with widely spaced, fire-resistant trees.

**THREATENED SPECIES** species likely to become endangered if not protected by laws.



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**Other images:** C. Benda: 4, 58, 82, 92; FPCC: 102; ISAS: 6, 46, 48, 50–56, 72, 84, 101, 108; M. Jeffords: 18; and G. Spyreas: 12.

## FOREST PRESERVES OF COOK COUNTY

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**CITATION**

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## ABOUT THE FOREST PRESERVES OF COOK COUNTY

The Forest Preserves of Cook County is the oldest forest preserve system in the nation, maintaining more than 69,000 acres of open land for the education, pleasure and recreation of the public. We strive to protect and restore the county's diverse ecosystems, so all our unique native plants and animals can live and thrive. Each year, millions of people use these lands and facilities to enjoy or study nature, bicycle, hike, fish, cross-country ski, picnic, golf, canoe or simply relax in a large preserve that leaves urban life behind.

**Forest Preserves of Cook County**  
**General Headquarters, 536 N Harlem, River Forest, IL 60305**

**Toni Preckwinkle, President**

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