South Cook County Communities

Millennium Reserve Green Infrastructure Project

Made possible with generous support from the Searle Funds at The Chicago Community Trust
The Chicago Wilderness
Millennium Reserve
Green Infrastructure Project
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The following agencies and organizations participated in developing the green infrastructure mapping protocols and mapping workshops to produce the underlying GI network of openspace, parklands, floodplains, and other available GIS information to establish, after ground-truthing with the local communities, the Core Green Infrastructure Network map, shown on the accompanying maps.

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Numerous municipalities, park districts, and other local jurisdictions participated in workshops to review the draft Core Green Infrastructure Network and to help identify green infrastructure Opportunity Areas – shown on accompanying maps.

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Chicago Wilderness Green Infrastructure Vision (GIV) was originally adopted by Chicago Wilderness in 2004. Working with The Conservation Fund and CMAP, Chicago Wilderness refined and updated the mapping in 2012.

http://www.cmap.illinois.gov/livability/open-space/green-infrastructure-vision

Downloadable green infrastructure datasets and GIS Shape Files are available for your use for the entire Chicago Wilderness region, including portions of Indiana and Wisconsin.

https://datahub.cmap.illinois.gov/dataset/green-infrastructure-vision-data

For those who need something less technical - See the Chicago Wilderness Green Infrastructure Vision, turn layers off and on and zoom into your own neighborhood or town using the Field Museum Interactive Mapper.


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Millennium Reserve Green Infrastructure Plan

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Supported by the Searle Funds at The Chicago Community Trust
Millennium Reserve is a 210 square mile opportunity – from Chicago to south Cook County – to transform our region. Millennium Reserve encompasses numerous neighborhoods on Chicago’s south side, the southeast lakefront and 37 south suburban municipalities. It’s goal is to catalyze innovative partnerships and action in the region that: Honor its cultural and industrial past; Restore and enhance the natural ecosystems; Support healthy and prosperous communities and residents; and Stimulate vigorous and sustainable economic growth. The Reserve recognizes that conservation and sustainable land use in urban areas are inextricably linked to healthy communities and a robust economy.

Millennium Reserve stretches from downtown Chicago southeast to the Indiana border and southwest to suburban Park Forest. It encompasses numerous neighborhoods on Chicago’s south side, the southeast lakefront, and 37 south suburban municipalities. In aggregate, the Reserve includes a collection of over 15,000 acres of open space such as parks, trails, wetlands, and forest preserves. Nearly 6,000 of these acres are considered high-quality natural areas. One million residents live within the Reserve.

Millennium Reserve is a shared vision that unifies public, nonprofit, and commercial leaders seeking to make the most of the region’s assets. Moreover, it is an ongoing initiative guided by partners who understand community priorities, and it is designed to make on-the-ground projects happen. The initiative includes projects that range from neighborhood-based in scale to those of regional significance. Millennium Reserve recognizes the work of partners, particularly those whose decades-long commitment to the region have created the foundation for this initiative.

The State of Illinois launched Millennium Reserve in 2012. An Executive Order in 2013 then established the Millennium Reserve Steering Committee, a stakeholder-driven leadership structure with the State as one of many partners. In 2014, the Steering Committee recommended 14 priorities for advancing transformative, regionally-significant opportunities. The Steering Committee’s work is complemented by the State Agency Task Force, charged with aligning and focusing State resources and authorities to advance Reserve goals.

Millennium Reserve is part of President Obama’s America’s Great Outdoors initiative, which works to align federal programs with locally-developed conservation and recreation goals. Since its inception, Millennium Reserve has welcomed over 100 partners and key stakeholders.

For more about the region see: Millennium Reserve and Greater Calumet Region Guidebook: http://www.millenniumreserve.org/resources/millennium-reserve-guide/
The Green Infrastructure Project

Chicago Wilderness utilized their successful Sustainable Watershed Action Team (SWAT*) model to engage the 36 communities of the Millennium Reserve - Calumet core in a green infrastructure mapping and planning process that increases awareness of local natural assets and issues and build the foundation for long-term natural resource protection and stewardship through sustainable land-use strategies.

The deliverables of this Chicago Wilderness SWAT project were:

1) Map the core green infrastructure for the Millennium Reserve. This focuses on an interconnected network of public and private open space and natural resources that conserves ecosystem functions, sustains clean air and water, and provides trails and greenways that benefit people and wildlife.

2) Engage communities in “Opportunity Areas” mapping for sustainable localized green infrastructure strategies. The project team worked with the communities to map potential “opportunity areas” for green infrastructure that include retrofits, brownfields, and other issues areas that represent priorities for site-based green infrastructure. Communities and area partners will be able to reference this map as potential places for future green infrastructure implementation projects.

3) Assist organizations and communities in the Millennium Reserve in understanding the impacts of climate change and potential adaptation strategies using green infrastructure.

The SWAT team members were privileged to meet and engage with multiple communities, agencies, and area organizations and individuals throughout the two and a half year process for this project. Information collected from this project has, already, and will continue to be used as background to many other ongoing task forces, projects and focus areas within the Millennium Reserve Area.

Who is Chicago Wilderness

Chicago Wilderness (CW) is an alliance of more than 325 diverse organizations protecting the lands and waters on which we all depend. The vision is to create a sustainable network of natural areas to provide critical homes for plant and animals, and vibrant open spaces for people.

CW represents:

- A metro region spanning 38 counties, over 500 municipalities and more than 10 million people across parts of four states
- More than 545,000 acres of protected areas
- A potential network of 1.9 million acres of protected, restored or connected lands and waters
- More than $14 million in federal conservation funds, leveraged to $280 million over 17 years
- Over 500 conservation, sustainable development and environmental education projects funded.

The regional CW Green Infrastructure Vision (opposite) was created with support from the Illinois Department of Transportation and Chicago Metropolitan Agency for Planning, and the Gaylord and Dorothy Donnelley Foundation.

For more information see: www.chicagowilderness.org
The South Cook County Communities

Built by waves of settlers and immigrants, founded on a blend of heavy industry and agriculture, Chicagoland’s South Suburbs has a complex past resulting in a region of mixed opportunities and challenges. Marked by successive eras of industrial growth followed by devastating neglect, a suburban boom that changed and challenged the landscape of America, and the resulting shifts in social and demographic geographies, in Chicago’s South Suburbs today we can uncover stories of success and perseverance that resonate with nearly all corners of American history. Although, the twenty-first century vision for South Cook County will not look like its past, any plan for the future must also embrace and reset the assets that established its legacy. Thirty-Five south suburban municipalities were included in Chicagoland Wilderness’ Green Infrastructure Vision for the Millennium Reserve. This plan seeks to offer definition for green infrastructure improvements that capitalize on assets, while respecting the ecology and history of the region.

Yankee settlers began arriving in the Calumet region in the 1830s and settled along old American Indian trails, establishing some of the earliest communities as regional economic centers serving agricultural settlements of German and Dutch farmers with retail, banking, transportation and medical needs. Soon thereafter, heavy industry began to locate to the Calumet region in the 1880s, dominating and defining its future for decades. By the mid-century, the Encyclopedia of Chicago reports that the region provided “95% of the metropolitan area’s jobs in primary metal industries, 72% in petroleum and coal products, 30% in chemicals, stone, clay, and glass products, and 21% in transportation equipment.” Metals and machinery remain the region’s largest exports. One of the largest stone quarries in the world, with 400-foot deep sedimentary deposits, is found in the Village of Thornton. Thousands pass above Thornton Quarry every day on the I-80 expressway, which also divides the region into north and south halves.

The region’s glacial past lives on in place names, such as Ridge Road in Lansing, which was formed by the shoreline of Lake Chicago, and Blue Island, which stood above the ancient lake. Reminders of American Indian settlement can be found in the names of Sauk Village or the Calumet River, which defined much of the region’s earliest settlement. The Little Calumet River, which flows from Indiana before turning back east for Lake Michigan, and its tributaries of creeks, drains the region. The flat, rich prairie, once the floor of glacial Lake Chicago, provided plentiful agricultural lands. Good quality clay led to sprawling brickyards, which in communities like Alsip employed hundreds to excavate and manufacture bricks. Elsewhere, swampy wetlands were reclaimed for industrial purposes.
Beyond the industrial areas located along the Little Calumet River and later the Cal-Sag Channel, truck farming was widespread. South Holland, a popular commuter suburb today, was once proclaimed the “Onion Set Capital of the World,” reminding us of the important role agriculture played in the South Suburbs’ past. Many of these agriculture products were bound for packing and canning in the communities that originally served as market centers, such as Dolton. Sugar beets grown in Crestwood were trucked to the Grand Trunk Western Railway for delivery to Michigan factories. Even today, at the southern edge the suburban region, agriculture continues with family-owned farm stands dotting Lincoln Highway in the Village of Lynwood.

National and belt railroads crisscross the South Suburbs, bringing freight to rail yards like those established in Riverdale or Markham, along with connections to international markets. The railroads employed thousands and continue to dominate the local economy in communities such as Hazel Crest. The right-of-way of the first railroads to arrive in the 1850s, the Rock Island and Illinois Central, are still used daily by Metra commuters. Others, such as the Pennsylvania Railroad and Michigan Central, have become successful “rails to trails” that provide recreation for the region, such as the Burnham Greenway or the Old Plank Road Trail. Recreation has always played a role in the south suburbs, with the development of the communities of Homewood, Flossmoor Olympia Fields and Midlothian spurred by popular and elite country clubs. Workers of more modest means were attracted to the many picnic grounds, some of which still survive as part of the Forest Preserve District of Cook County (FPDCC). The FPDCC has been instrumental in creating a new network of water trails that promise to bring residents and visitors back to the Little Calumet.

Dixie Highway, which cuts North and South through the south suburbs, carried travelers from Chicago to Miami. We are reminded of the prominent role the highway played in the early development of the south suburbs in the Village of Dixmoor. Chicago Heights boasts its status as “The Crossroads of the Nation,” where the Dixie Highway converges with the Lincoln Highway, America’s first transcontinental roadway, dedicated in 1913. Its neighbor, South Chicago Heights, was settled around an even earlier intersection, the Sauk Trail, which ran from Detroit to the Mississippi River, and Hubbard’s Trail, which connected Chicago and Fort Dearborn with the Forts of Vincennes, Indiana. In the nineteenth century many farmers provided refuge to escaped slaves from the South and historic Underground Railroad sites dot the region. African-American history is strongest in the villages of Ford Heights and Robbins, the first community incorporated by African-American residents in the North, where the future of the Tuskegee Airmen Program was born with the establishment of the Robbins Airport and the John Robinson School of Aviation.

Early land companies, many backed by prominent Chicagoans, advertised and developed the South Suburbs’ historic residential districts. The community of Harvey was established as a model industrial town, based on the success of nearby
Pullman. Others were platted to attract the European ethnic immigrants arriving in the Calumet region. The availability of jobs in heavy industry led to the establishment of the Village of Posen, which was advertised as the most Polish community in America. Pride of place defines many South Suburban communities, and smaller municipalities like Phoenix and East Hazel Crest were established to maintain local control and identity. After World War II, as suburban development pressed further south into farm lands, an entire village was privately designed: Park Forest, a planned town with housing for GIs and other young families ringing an outdoor shopping center and town hall, generated national interest and acclaim.

The population of south Cook County continued to grow as families left Chicago for opportunities in the suburbs, carried by the construction of new interstate highways. With quick access to Chicago’s Loop, builders found communities like Calumet Park ready for development with neat lines of mid-century brick bungalows. The villages of Glenwood, Matteson, Richton Park and Oak Forest quickly grew through annexation and the subdivision boom of late 1960s and 1970s. This also brought a new era of regional commerce, with the establishment of River Oaks Shopping Center in Calumet City, and more recently commercial supercenters in Country Club Hills.

As we can expect from its rich and varied history, South Suburban communities today are incredibly diverse. Its population is young, with 30% of the region’s nearly 475,000 people under 20 years old. Over half of South Suburban residents are African-American, though there is a growing Latino community.

While income varies widely across the region, 15% of residents live in poverty. With a legacy of industrial development in an era before Federal regulation, many are environmental justice communities that lack the resources to fight discrimination in the social and built environment.
The goal of the Green Infrastructure Vision team within the Millennium Reserve was to work with municipal resources at all levels to educate communities about the potential of green infrastructure and other community development resources and assets. The team then worked with communities to map concepts related to green infrastructure and to provide networking opportunities with other municipalities, as well as regional, state, and federal entities. Advocacy groups and agencies that have a history of working across jurisdictions within the region provided expertise and institutional knowledge about current and past sustainability efforts. Park Districts, who often have separate elected boards, were also included. In this way, direct input from staff in nineteen communities, plus Cook County and Community College Districts, helped create opportunity areas within the Millennium Reserve.

A spirit of cooperation, of shared resources, is a hallmark of the resilient communities found in the hardworking south suburban region. The Green Infrastructure Vision hopes to shine a light on their path toward sustainability and prosperity.
Both nationally and regionally, the term “green infrastructure” has a range of meanings. That range is simplified here into three categories.

**Landscape-based green infrastructure:**

This is perhaps the meaning most commonly applied to green infrastructure. It is based in the idea that certain lands have an inherent value that can be made even greater when a part of a network. The Conservation Fund defines it this way:

Strategically planned and managed networks of natural lands, working landscapes and other open spaces that conserve ecosystem values and functions and provide associated benefits to human populations.

Under this definition, the foundation of green infrastructure networks are the natural elements – river corridors, woodlands, wetlands, grasslands – that work together as a whole to sustain ecological values and functions. But green infrastructure also can include working lands, trails and other recreational features, and cultural and historic sites.

**Biodiversity-based green infrastructure:**

In its Green Infrastructure Vision, Chicago Wilderness adopts a related meaning for green infrastructure—one that focuses on the goal of supporting biodiversity. Chicago Wilderness defines green infrastructure as:

*The interconnected network of land and water that supports biodiversity and provides habitat for diverse communities of native flora and fauna at the regional scale. It includes large complexes of remnant woodlands, savannas, prairies, wetlands, lakes, stream corridors and related natural communities. Green infrastructure may also include areas adjacent to and connecting these remnant natural communities that provide both buffers and opportunities for ecosystem restoration.*

This definition reflects both existing green infrastructure – forest preserve and park district holdings, state parks, and designated natural areas – as well as opportunities for expansion, restoration, and connection.

**Nature-based alternatives to gray infrastructure:**

This definition of green infrastructure focuses on nature-based alternatives to conventional “gray infrastructure” technology and engineering. In this context, green infrastructure can be used to describe products, technologies, and practices that use natural systems—or engineered systems that mimic natural processes—to enhance overall environmental quality and provide utility services. The U.S. Environmental Protection Agency identifies green infrastructure techniques, such as green roofs, porous pavement, rain gardens, and vegetated swales, which use soils and vegetation to infiltrate, evaportranspirate, and/or recycle stormwater run-off. In addition to effectively retaining and infiltrating rainfall, these technologies also can filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon.

This plan integrates each of these meanings into a single comprehensive view of green infrastructure. It encourages not only sustainable land use and open space protection but also innovative, green technology to restore and protect water and other natural resources.

This plan emphasizes mapping, protection, and restoration of green infrastructure in
the very diverse Millennium Reserve region. It recognizes that implementation of green infrastructure plans and policies should be undertaken at multiple spatial scales, from small sites to large regions. The figure below highlights the range of scales. It also recognizes that effective green infrastructure implementation requires coordination and involvement by local governments, other government agencies, private organizations, developers, and private landowners in order to maximize the benefits.

The following are some examples of green infrastructure planning and implementation at various geographic scales.

**At the Regional Scale**

_The Chicago Wilderness Green Infrastructure Vision_ provides a regional framework for green infrastructure mapping and planning. At a sub-regional scale, the extensive historical planning that has been undertaken for the greater Calumet region has identified various green infrastructure elements, such as waterways, greenways, and regional trail corridors. The extensive land acquisitions of the Forest Preserve District of Cook County are another example of regional GI implementation that spans numerous municipalities and townships across south Cook County. Other examples of sub-regional green infrastructure planning are the various projects facilitated by the South Suburban Mayors and Managers Association such as the _Midlothian Creek Green Infrastructure_ plan.

**At the Community Scale**

At the community level, efforts can be made to incorporate GI maps and recommendations into municipal, county, and park district land use plans and maps. GI principles can be used to shape land use and zoning maps and provide a framework for more sustainable zoning, subdivision, stormwater, and landscaping codes as well as conservation design ordinances. This can apply to new development as well as redevelopment and capital improvement plans. GI principles also can influence land acquisition and trail priorities of local park and open space agencies. Orland Park is an example of a south suburban community that has taken a progressive approach to the planning and implementation of open space, greenway, and trail priorities.

**At the Neighborhood Scale**

Neighborhoods, both existing and new, can be transformed to incorporate conservation design principles. This means the subdivision review process includes open space protection, natural landscaping, and stormwater best management practices that preserve biodiversity and natural resource functions in the design of the neighborhood. Not only does this preserve and enhance the natural environment, it also brings nature closer to families and children.

A number of local governments in northeastern Illinois, including McHenry County, Woodstock, Crystal Lake, and Algonquin, have developed comprehensive conservation design ordinances for new development on sensitive sites. The new Watershed Management Ordinance adopted by the Metropolitan Water Reclamation District (MWRD) provides for protecting natural hydrology and water quality from the adverse impacts of development throughout Cook County.

**At the Site Scale**

Small sites, including residential yards, businesses, school grounds, and parks can incorporate practices that treat stormwater as a resource and provide habitat for native species. This is accomplished through practices like bioswales, rain gardens, permeable paving, and natural landscaping. Blue Island has been a local leader in the installation of green infrastructure demonstration projects such as rain gardens and rain barrels.
Green infrastructure is a vital and important resource to every community. Green infrastructure helps protect existing ecological and water resource systems and their associated social and economic functions. Preserving green infrastructure and managing it properly can provide numerous related benefits. Some of the key green infrastructure purposes and benefits identified in the Millennium Reserve planning area include:

### Environmental Benefits
- Biodiversity and habitat protection
- Improved water quality
- Enhanced groundwater recharge
- Reduced flood damage
- Reduced erosion
- Carbon sequestration
- Resiliency to changing climate

### Economic Benefits
- Reduced life-cycle costs of infrastructure
- Expedited permitting
- Green industry jobs
- Green marketing potential
- Green architecture
- “Ecotourism” opportunities

### Social Benefits
- Greenway, trail, and open space connections
- Enhanced recreational opportunities
- Community health and mobility

### Community Benefits:
- Contributing to the area’s identity and sense of place.
- Enhancing property values.
- Expediting the development planning process by identifying resource areas and corridors before development is proposed.
- Creating a vision of the future to guide a community’s long-term planning goals and objectives.
- Providing a better means of evaluating economic and environmental factors when making land use decisions.
- Ensuring that development and open space activity are encouraged and established in appropriate and compatible locations.

### Water Resource Key Benefits:
Green infrastructure provides a more sustainable, and often less expensive, alternative to managing water quantity and quality. In contrast to grey infrastructure, green infrastructure utilizes soils and vegetation to infiltrate, evapotranspirate, and/or recycle precipitation and stormwater runoff. The U.S. Environmental Protection Agency and others have thoroughly documented many of these benefits which are summarized below. [http://water.epa.gov/infrastructure/greeninfrastructure/gi_why.cfm](http://water.epa.gov/infrastructure/greeninfrastructure/gi_why.cfm)

**Flooding:** Conventional stormwater infrastructure quickly sheds rain water and drains stormwater to rivers and streams, increasing peak flows and flood risk. Green infrastructure can mitigate flood risk by slowing and reducing stormwater discharges. Through practices like permeable paving and rain gardens, this is accomplished by holding water in the soil, storing it temporarily in sand or gravel, and using vegetation to return water vapor to the atmosphere.

A notable example of how green infrastructure reduces stormwater discharges is a demonstration project in Burnsville, Minnesota. An entire neighborhood was retrofitted with rain gardens and compared to a neighborhood where no retrofits occurred. After two years, researchers showed that runoff volumes were reduced by approximately 90 percent due to the infiltration, storage, and evaporation of water provided by the rain gardens.

**Within Millennium Reserve,** most of Chicago and some nearby suburbs are served by combined sewers. While MWRD’s Tunnel and Reservoir Plan (TARP) will eventually eliminate most combined sewer overflows, some basement flooding and other local flooding concerns will remain due to inadequate capacity of local sewers. Green infrastructure can be used as a complement to grey infrastructure in these areas to further reduce combined sewer overflows and basement flooding. As it reduces the quantity of runoff entering combined sewers, green infrastructure also can reduce the amount of flow that requires pumping and treatment at MWRD’s treatment plans.
Equally important to the flood prevention benefits of engineered green infrastructure are the natural benefits of protected floodplains, wetlands, and stream corridors in slowing, storing, and absorbing flood waters. The Calumet River and Thorn Creek corridors and the substantial holdings of the Forest Preserve District of Cook County are notable in this regard.

**Water quality:** Stormwater from developed areas flushes many pollutants to our streams, lakes, and beaches - including pathogens, nutrients, sediment, and heavy metals. In cities with combined sewer systems, high stormwater flows can also send untreated sewage into our waters and basements. By retaining rainfall from small to moderate-sized storms, green infrastructure reduces runoff and lower discharge volumes translate to lower pollutant loads. Green infrastructure also treats stormwater that is not retained, greatly reducing contamination to area waterways and wetlands.

**Water supply:** Rainwater harvesting and infiltration-based practices increase the efficiency of our water supply system. Water collected in rainwater harvesting systems, like cisterns, can be used for outdoor irrigation and some indoor uses and can significantly reduce municipal water use. Water infiltrated into the soil can recharge groundwater, an important source of water for both public consumption and for maintaining natural baseflows to streams and wetlands. In addition, using green infrastructure practices like native landscaping can greatly reduce the demand for irrigation of turf grass and conventional landscapes. Irrigation needs can account for as much as 20 to 30 percent of the annual water usage in many communities.

**Biodiversity and Habitat Benefits**

The Millennium Reserve planning process has led to the development of a green infrastructure network map. Protection of green infrastructure networks, via public and/or private means, is critical to the survival and health of biodiversity in the planning area and the broader Chicago Wilderness region. Chicago Wilderness has identified several key benefits of protected networks.

**Protection of sensitive species:** Within Millennium Reserve are several designated Illinois Natural Areas. Protection of Natural Areas and other high quality natural remnants provides safe haven for rare or threatened species of plants and animals that are rarely found outside of the green infrastructure network. The Indian Boundary Prairies are examples of such high quality habitats.

**Support of wildlife life-cycle needs:** Many important species of insects and animals require diverse natural areas that contain “community mosaics” of wetlands, woodlands, prairies, and stream corridors. These large areas contain a diversity of habitat types that may be needed for mating, reproduction, and foraging. Examples of species that require such diverse habitats are sandhill cranes and the endangered Blanding’s turtles.

**Protection from adverse effect of developed landscapes:** Chicago Wilderness, in its Biodiversity Recovery Plan, has identified quantitative targets (i.e., acreages) for protecting very large tracts of contiguous woodlands, savannas, prairies, and wetlands. Large, uninterrupted holdings are critical to the survival of many animal species including meadowlarks, bobolinks, and other grassland birds require natural grassland free of trees and brush to thrive successfully. Large preserves like Bartel Grassland near Tinley Park provide grassland habitats and Zander Woods Forest Preserve in Thornton provides large woodland/savanna habitat for sensitive woodland birds, amphibians, and mammals.

**Migration corridors:** Functional green infrastructure connections allow for the effective movement and migration of animal and plant species between sites. In the Millennium Reserve this includes stream corridors and even neighborhood tree canopies. These corridors effectively link Forest Preserves, parks, private preserves, and neighborhoods via greenways and landscape buffers. The value of these corridors is enhanced when they include native plant for species such as monarch butterflies.
Recognizing the potential for changes in climate to disrupt their social and economic fabric, cities around the world are developing strategies for reducing greenhouse gas emissions, modifying programs to adapt to a warmer future, and engaging civil society in this effort.

Because urban areas are responsible for nearly three-quarters of global energy-related carbon emissions (Rosenzweig et al. 2010), the early emphasis of individual cities and these collaborations understandably was on reducing greenhouse emissions (Wheeler 2008).

Only recently, as the inevitability of a rapidly changing climate has become apparent, have cities begun to focus on approaches to reduce risks in the face of climate change as being of equal importance (Bulkeley and Betsill 2013). However, urban adaptation efforts focus on protecting values like public health, livelihoods, and infrastructure, with little attention paid to protection of urban nature, and the benefits nature provides to urban residents.

At the same time, cities and associated metropolitan areas are becoming increasingly important to global biodiversity conservation. Most cities have been founded in places that are biodiverse and functionally valuable to society, such as in floodplains, along coasts, on islands, or near wetlands. Today, urbanization continues to expand into these valuable habitats and into the hinterland where society most often placed its biological reserves (McDonald et al. 2008). Species previously outside city limits may need to migrate through urban areas as they adjust to a changing climate (Hellmann et al. 2010). Some metropolitan areas now contain important populations of rare species (e.g., Blanding’s turtle and the Prairie White Fringed orchid occur in the greater Chicago region), made more vulnerable to extirpation by their typically small population sizes and fragmented distribution patterns (McDonald 2013). Terrestrial natural areas in urban settings provide critical habitat for resident and migratory native species, but tend to be small and isolated remnants of formerly widespread habitats that are increasingly vulnerable to loss and degradation from a host of urban-centric stressors (Kowarik 2011, Cook et al. 2013).

Green infrastructure offers the opportunity to restore and/or enhance the ecological functions of these urban natural areas and other undeveloped or formerly developed spaces to provide increasingly important, but highly threatened,
benefits to biodiversity and human communities of metropolitan regions (Goddard et al. 2011, Hostetler et al. 2011, Kattwinkel et al. 2011).

Likewise, freshwater biodiversity is threatened by both water withdrawal for urban consumption (McDonald et al. 2011) and the addition of pollutants from urban stormwater, industrial, and residential sources (Alberti 2005, Blanco et al. 2011).

These biodiversity impacts are all projected to accelerate as global urbanization trends continue to increase (McDonald 2013).

Creating green infrastructure plans and projects using a climate lens will help to ensure the resulting resources and recommendations are developed from a perspective of achieving a diverse urban ecosystem that can provide benefits to wildlife and to people now and in the future. Making urban natural areas and green spaces as healthy as possible is in itself a climate mitigation strategy because a healthy system will be able to deliver critical functions, including the capture and storage of carbon in soil and plant roots. Improving health and connectivity of urban green spaces also serves as an adaptation strategy, providing critical habitat for wildlife needing to migrate and disperse through a difficult urban matrix, and sustaining ecosystem services such as stormwater capture and reducing the urban heat island effect.

In the absence of actions that adapt protection, planning and management practices, climate change has the potential to jeopardize many biodiversity conservation investments made in the Chicago Wilderness region during the past 30 years.

For the past five years the Chicago Wilderness Climate Change Task Force has focused on creating place-based resources to help inform on-the-ground planning and management decisions. This process involved translating downscaled climate change projections developed for the Chicago Climate Action Plan (Hayhoe and Wuebbles 2008) into an understanding of how a warmer, drier and more extreme environment could affect regional biodiversity and, importantly, what actions could be taken to reduce the impacts.

A goal of the Millennium Reserve green infrastructure planning project is to include climate in a meaningful way. Toward that end, the co-chair of the Chicago Wilderness Climate Action Initiative provided the following information to the natural resource expert stakeholder group and the broader community stakeholder group for their consideration in the planning process: general “climate science 101”; overview of downscaled climate models for the region; overview of anticipated impacts to biodiversity and people; co-benefits of green infrastructure projects (i.e., urban forest adaptation strategies) to climate mitigation and adaptation; asset-based climate change messaging for communities.

In addition, multiple place-based resources were provided to the stakeholder groups, including the Climate Considerations Guidebook for Natural Areas and Green Spaces in the City of Chicago (https://adapt.nd.edu/resources/1019), the Chicago Community Climate Action Toolkit (http://climatechicago.fieldmuseum.org/), the Climate Change Update to the Chicago Wilderness Biodiversity Recovery Plan (http://climate.chicagowilderness.org/index.php?title=Main_Page) and the Climate Adaptation Guidebook for Municipalities in the Chicago Region (http://tinyurl.com/l2q57tw). The information and materials are intended to contextualize climate change impacts for the Chicago Region and provide climate considerations for natural resource experts and decision makers to use and integrate into their green infrastructure planning and management processes.
Green Infrastructure is becoming a more widely accepted alternative approach for new development, re-development, or replacing aging grey infrastructure based on the merits of its environmental benefits. And now there is growing documentation, regionally and nationally, supporting the conclusion that the long-term (i.e., life-cycle) costs of green infrastructure are often less than or equal to the costs of grey infrastructure.

The U.S. EPA has compiled extensive information of this topic. Based on 17 case studies nationally (including several from Illinois), EPA concluded that when stormwater management systems are based on green infrastructure rather than grey infrastructure, developers often experience lower capital costs. [http://water.epa.gov/polwaste/green/upload/2008_01_02_NPS_lid_costs07uments_reducingstormwatercosts-2.pdf](http://water.epa.gov/polwaste/green/upload/2008_01_02_NPS_lid_costs07uments_reducingstormwatercosts-2.pdf)

These savings derive from lower costs for site grading, paving, and landscaping, and smaller or eliminated piping and detention facilities. EPA also reported that in cities with combined sewer systems, like Milwaukee, green infrastructure controls may cost less than conventional controls, and green-gray approaches can reduce public expenditures on stormwater infrastructure.

While a true comparison of green vs. grey infrastructure costs often will require a site specific analysis, there are several basic principles that are relevant for most projects.

**Reduced up-front costs:** Some green infrastructure approaches reduce or eliminate the need for expensive grey infrastructure. A common example is the use of inexpensive naturalized swales or bioswales in lieu of traditional storm sewer drainage systems. Similarly, conservation developments that reduce mass grading and road and utility lengths can substantially reduce their infrastructure costs.

**Reduced life-cycle costs:** Some green infrastructure practices last substantially longer than grey infrastructure alternatives, thereby reducing life cycle costs. A good example is a permeable paving parking lot that often costs more to initially install than conventional concrete or asphalt but has a much longer life span. When considering total cost outlays over a time span of 20 to 30 years, for example, permeable paving may be significantly less expensive. When the stormwater storage under permeable paving is factored in (thereby reducing detention needs), the cost advantages for permeable paving are even stronger.

**Reduced maintenance costs:** Depending on the particular practice, green infrastructure may be more or less expensive to maintain than conventional infrastructure. But maintenance costs of some green infrastructure practices are much less expensive than their grey counterparts. A good example is natural landscaping in comparison to turf grass. While most turf installations require regular mowing and irrigation, well-established natural landscapes require relatively little long-term maintenance. Natural landscapes do require long-term spot control of invasive weeds and a regular schedule of controlled burning, but these costs are substantially less than maintenance costs for most turf installations.

Multiple benefits: While most grey infrastructure practices have a single purpose (e.g., stormwater drainage or flood control), most green infrastructure practices provide multiple benefits. For example, while storm sewers are meant to merely convey runoff, bio-swales convey, store, treat, and infiltrate runoff. Green roofs not only reduce runoff volumes, they also reduce urban heat-island impacts and reduce heating and cooling costs for buildings. Native landscaping and use of trees in urban design can enhance property values, reduce air pollution, mitigate climate change impacts, and reduce energy costs. EPA has compiled links to a number of studies from around the country on this topic. [http://water.epa.gov/infrastructure/greeninfrastructure/gi_costbenefits.cfm](http://water.epa.gov/infrastructure/greeninfrastructure/gi_costbenefits.cfm)

**Reduced need for public infrastructure investment and remediation:** Regardless of the potential cost savings to developers, green infrastructure provides considerable public benefits and reduces public remediation costs for problems like flooding and stream channel erosion. The use of native landscaping instead of turf can substantially reduce demand for irrigation, thereby reducing the need to size water supply infrastructure to
meet extreme summer-time demands. Another example is the creation of open space, greenways, and trails in private developments that provide connections to public recreation systems or, in some cases, are donated directly to public open space agencies.

Several additional references are offered for further reading on this topic. Banking on Green: A Look at How Green Infrastructure Can Save Municipalities Money and Provide Economic Benefits Community-Wide, ASLA http://www.asla.org/ContentDetail.aspx?id=31301

The economic development potential for green infrastructure varies by community and opportunity, but in all cases significant community-level investment in green infrastructure amenities offers modest to substantial economic development benefits.

At a modest level, by improving quality of life and exploring alternative green flood mitigation strategies, green infrastructure can revitalize vacant parcels. This can be something as simple as improving the aesthetics and functionality of area blight by strategically adding green infrastructure elements, including a more attractive and deliberate native plant palette. Communities like Philadelphia have utilized green infrastructure to shore up blighted areas by making them more attractive and functional, which helps to retain property values. At another level, green infrastructure can provide innovative stormwater management techniques that can make an undevelopable site more attractive for development, as green infrastructure can be more dynamic than traditional stormwater management techniques.

Green Infrastructure & Jobs

The job creation potential for green infrastructure is just beginning to be realized. From water reuse, to ecological restoration, to maintenance and design, and even to industrial production, the job growth potential for green infrastructure is substantial. As government and the private sector become increasingly aware of the many applications green infrastructure provides, the employment opportunities will continue to grow.

Indeed, the dollar value assigned to green infrastructure nationally is growing substantially. For example, New York City has committed $2.6 billion to green infrastructure projects over the next 20 years, and Philadelphia has promised $1.67 billion through 2036, see http://www.americanrivers.org/assets/pdfs/reports-and-publications/staying-green-and-growing-jobs.pdf. Such significant contributions to green infrastructure offer employment in many sectors:

- Engineering and Design: Civil engineering, landscape architects, and other design professionals are employed to apply best management practices in various circumstances.
- Legal: Attorneys are utilized to updated municipal codes, address water quality-related legal concerns, and develop policies.
- Not-for-Profits: The not-for-profit world has embraced green infrastructure at many levels, including analysis of benefits, job training, policy promotion, and implementation.
- Industry: There are multiple opportunities just being realized in the green industrial realm. These opportunities address production of new materials, such as pavement and green roofs.
- Trades: Plumbers and electricians are increasingly identifying with green infrastructure. Water systems must be installed by plumbers, while electricians find new efficient methods to manage technologies that monitor green infrastructure systems.
- Ecologists: Ecologist research and apply the benefits of native plant species to green infrastructure projects.
- Landscape Firms: Landscape firms are offering native plant installation and on-going maintenance programs for green infrastructure projects.

As the green infrastructure industry matures, new applications and employment programs continue to emerge. The Millennium Reserve region is poised to capitalize on these efforts through job training programs like OAI, Inc., Greencorps Chicago, and related employment-focused organizations that are beginning to develop jobs in the region. The potential for GI job growth is significant and should be considered for its “cutting edge” value by south Cook County communities.
The Green Infrastructure Workshops

Mapping green infrastructure for the Millennium Reserve Community Area project was done at two levels. The first was the mapping of a network of existing green infrastructure. In this context, green infrastructure includes both existing open space and natural areas such as wetlands, stream corridors, and woodlands. In brief, the green infrastructure network was developed through a three-step process:

1. Developing an inventory of natural resource and open space data using the technology and databases of SSMMA’s geographic information system (GIS)
2. Working with natural resource organizations to develop a draft green infrastructure network map
3. Working with communities to review and refine the map

The mapping process was also used to identify “opportunities” for green infrastructure in developed landscapes through various retrofitting, restoration, and redevelopment practices. (See Opportunity Areas section pages 24-40)

Some of the key purposes of a green infrastructure network include preserving and connecting habitats for flora and fauna, providing natural storage and filtering of stormwater and flood waters, and connecting people and neighborhoods via trails and greenways. In a green infrastructure network, every connection strengthens the network further. By identifying and mapping a network, areas of the Millennium Reserve that have regional significance are revealed and their values are better understood by local residents or agencies. This knowledge provides an opportunity for communities to think regionally and act locally.

The process used in Millennium Reserve builds on the green infrastructure mapping approach used in other SWAT projects, such as McHenry County and Kane County. It also reflects considerations for the Midlothian Creek Green Infrastructure mapping and plan completed prior to this process.

It also builds on the approach used in the regional GIV 2.0. but tailors them to more specific available data from SSMMA’s data bases.

Existing Natural Resource and Open Space Inventory Mapping:

The SSMMA GIS data base contains a number of natural resource and open space data sets.
Initially, SSMMA staff compiled relevant data based on the data sets used in the Chicago Wilderness GIV 2.0 project, as well as other SWAT GI mapping projects.

After the initial inventories were assembled, advice and assistance was sought from an advisory committee of experts from regional and local natural resource and conservation organizations. These organizations included:

- U.S. Department of Agriculture, Natural Resources Conservation Service
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency, Region 5
- U.S. Department of the Interior, Fish and Wildlife Service
- Illinois Nature Preserves Commission
- Illinois Department of Natural Resources
- Forest Preserve District of Cook County
- Metropolitan Water Reclamation District
- Governors State University
- Metropolitan Planning Council
- Field Museum
- Openlands
- Trails for Illinois

Data sources were then supplemented or replaced by more current local data sets where appropriate, such as the addition of remnant oak woodlands mapping from Chicago Wilderness and the Morton Arboretum.

The most important data layers with respect to habitat, biodiversity, and water resources protection, regardless of whether they are currently protected or regulated, were identified through the advisory committee process. These data layers became the foundation for what is referred to in this plan as core green infrastructure. Core green infrastructure is the backbone of the green infrastructure network, identifying and connecting large clusters of ecologically important areas.

The advisors endorsed several key Chicago Wilderness green infrastructure planning principles, including the principle that the size and connectivity of resource areas are of great importance. Elements of this approach include:

- Protecting large core reserves (or nodes);
- Linking core areas with corridors (or landscape linkages);
- Protecting complexes of adjacent resource areas (e.g., wetland, woodlands, and prairies); and
- Buffering critical areas from conflicting activities or land uses

Core Natural Resource Data Layers

In consideration of previous factors, the following core natural resource data layers were included in the base mapping:

- Waterways/Lakes/Streams (add source)
- Wetlands (Source)
- 100-year Floodplain (Source)
- Illinois Natural Inventory Sites (INAI)
- IDNR Nature Preserves
- IDNR Land and Water Reserves
- Remnant oak woodlands (Chicago Wilderness)
- Cook County Forest Preserve Lands
- 200-foot buffers. (Buffers were added to all of the natural resource layers above.)
- Threatened and Endangered Species locations
- Natural Areas/Open Space (Source/description)
- MWRD Land
- Chicago Parks
- Threatened and Endangered (T&E) Species Locations*
- Commonwealth Edison Rights of Way
- Regional Bike Trails

* Note that T&E locations were used for planning purposes but not explicitly shown on the final GI maps.

A buffer of 200 feet, as noted above, was placed on the periphery of the most critical natural resource and forest preserve layers. This buffering approach was based, in concept, on the approach used in mapping the Chicago Wilderness GIV. Buffers signify that it is important to not only protect critical resources, such as important habitat areas, but also be sensitive to activities and lands uses in adjacent areas. Buffers also provide mapping connections for natural resource areas that appear as separate polygons on a map but actually function as an interconnected complex from a habitat perspective.

The use of a 200-foot buffer is intended for planning purposes, and is not necessarily intended as a regulatory recommendation. For comparison, various county stormwater management ordinances stipulate stream and wetland buffer requirements ranging from 25 to 100 feet, depending on resource quality and size. In comparison, recommended habitat buffers reported in
some publications on green infrastructure can exceed 300 feet for sensitive wetland habitats or sites containing certain endangered or threatened species.

In addition to the core natural resource layers, the Millennium Reserve area has a wealth of additional natural resource mapping. These additional resource data were characterized as supporting green infrastructure. It was established that the supporting data would be used on a case-by-case basis to inform decisions about core green infrastructure mapping. The following are examples of supporting natural resource data layers and information were available for the mapping process:

- Hydric soils
- GIV 2.0 layers
- Brownfields
- Combined sewer service areas

Core Green Infrastructure Mapping Workshop

Using the mapping data and assumptions described above, the project team and representatives of natural resource and conservation organizations participated in a half-day green infrastructure mapping workshop. The focus of the workshop was an immense printed map – 12 feet by 16 feet in size. The map was color coded with all of the referenced core natural resource data layers, including buffers, all overlain on a screened aerial photo base. Supporting this map was the capability to digitally project additional supporting natural resources data on a screen.

This map was used to guide resource experts in the mapping of an interconnected green infrastructure network. At the workshop, the experts were engaged in three specific tasks.

1. Add any missing resources, such as newly protected open spaces.
2. Remove any mapped resources that don’t meet the definition of GI. An example is public land parcels that are primarily impervious and/or developed.
3. Make connections to adjacent isolated GI resources to establish connectivity. Generally if adjacent resources were within 200 feet, a connection was made.

The maps were marked up and notes were taken to describe the referenced changes, additions, deletions, and connections.

After the mapping workshop, the mark-ups were digitized and a refined core green infrastructure maps was prepared. The revised map was then shared with local governments in two workshops – one for a southern cluster of communities and one for a northern cluster. Invited participants included municipalities, park districts, MWRD, and Cook County departments.

To make the maps easier to interpret and understand, the various core green infrastructure base layers were aggregated into several categories. These were:

- Public parks and preserves
- Private open space
- Other environmental resource areas
- Regional Trails
Underlying resources, including floodplains, wetlands, and woodlands, were depicted using cross-hatching and shadings.

The local government participants were asked to review the maps and focus primarily on two types of possible revisions:

• Open space or parks
• Regional trails or connections to regional trails

One category that was recommended for addition was parts of several school campuses that were either in or adjacent to certain resource areas, such as floodplains or wetlands. The recommended changes and mark-ups from the local government workshops then were digitized and a refined core green infrastructure maps was prepared.

**Final Green Infrastructure Network Map**

The green infrastructure mapping process, described above, resulted in the creation of the Green Infrastructure Network Map. It is the intent of this plan that this map serve as the basis for spatial green infrastructure planning throughout the Millennium Reserve. The Network Map provides an awareness of where important environmental resources lie and reveals the interconnectedness of those resources.

This map is dominated by the three shades of green that represent the principal, aggregated categories of green infrastructure network.

• **Publicly Protected Parks and Preserves (with buffer):** These areas are drawn in dark green. They are comprised of Cook County Forest Preserves, MWRD holdings, IDNR Nature Preserves and IDNR Land and Water Reserves, state parks, and municipal and district parks. These areas represent the portions of Millennium Reserve which are protected and managed by state or local agencies. These areas may or may not be open to the public. Included in this category is a 200-foot buffer around the outside edge of the original mapped areas.

• **Private Open Space:** These areas are drawn in light green. They are comprised of land that is privately owned but either precluded from development or is unlikely to be developed based on its current use. Private open space includes golf courses, private conservation easements, subdivision common areas, and camps.

• **Environmental Resource Areas:** These areas are drawn in yellow green. They are comprised of waterways/lakes/streams, wetlands, oak woodlands, Illinois Natural Areas Inventory (INAI) sites, and 100-year floodplains that do not otherwise fit into the private or public open space categories. These areas were chosen to be included here because they provide, or have the potential to provide, valuable natural functions such as storm water management, aquifer recharge, water filtration, and flora and fauna habitat.

In addition to these categories, the map also highlights some of the important underlying green infrastructure components. Specifically, it includes symbology for floodplains, water, wetlands, and oak woodlands, as well as regional trail information.

• **Wetlands:** This category is mapped in a pale blue color and identifies areas of wetlands that were mapped in the National Wetland Inventory (NWI).

• **100-year floodplains:** Floodplains are mapped in a blue cross hatch and reflect the official 100-year boundaries adopted by the Illinois DNR and FEMA.

• **Remnant oak woodlands:** This category identifies areas of oaks woodlands and savannas that were mapped in 2013 by the Morton Arboretum following a protocol adopted by Chicago Wilderness. These areas are the last remnants of the vast woodlands that predated European settlement in the county.

• **Regional trails:** These trials are highlighted in red and represent trails identified by existing trails plans collected during the process. Many of these trails are owned and managed by the forest Preserve District of Cook County. Some of the more notable trails within Millennium Reserve include the Burnham Greenway, the Thorn Creek Bicycle Trail, the Tinley Creek Bicycle Trail, and the recently opened Cal-Sag Trail. In addition, the regional trails mapping includes trail lops that are largely contained within some of the larger Forest Preserves.

The resulting “Chicago Wilderness Millennium Reserve Core Green Infrastructure Map, pages 24-25, was used as a base map to begin the “Opportunity Area” mapping in the next project phase.
Supported by the Searle Funds at The Chicago Community Trust

Chicago Wilderness Millennium Reserve Green Infrastructure Map DRAFT

Public Parks, Preserves & Conservations Areas (with buffer)
Private Open Space (with buffer)
Environmental Resource Area: Wetlands, floodplain, woodlands, GI connections (with buffer)

Waterway, Lakes, Streams
Floodplain
Remnant Oak Woodlands
Wetlands
Regional Bike Trails

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Various development opportunities, existing and proposed, lend themselves to green redevelopment and retrofitting within the Millennium Reserve. Coordinated planning and implementation are critical because green infrastructure resources often do not observe political boundaries. Working with the resource experts and communities, the project team has developed a list of higher priority green infrastructure opportunities and recommendations.

Some examples of projects and general recommendations that will take coordinated planning actions are:

- **Protection of sensitive streams, wetlands and river resources** - best achieved if all of the communities in a watershed work together to develop consistent stormwater and conservation design ordinances. Working with ordinances and education programs, local governments can maximize the opportunity for water to be treated with green infrastructure practices, such as rain gardens, before it moves offsite.

- **Connectivity will be optimized** - when new subdivisions, parks, businesses, and commercial developments incorporate local greenways, trail linkages, and bikeways where people live, work, recreate, and shop. There are an array of techniques that can be used to protect and implement green infrastructure projects, as well as existing green infrastructure assets, like parks and forest preserves.

These techniques may be applied not only to lands mapped in the green infrastructure network, but also to smaller areas that, though unmapped, have local importance and a community feels is deserving of protection. Implementation recommendations (page ?) are provided for each of the following techniques:

- **Acquisition by public agencies**
- **Conservation easements on private land**
- **Targeted land use planning and zoning**
- **Conservation development**
  - **Greenway connections**
  - **Trails**
  - **Landscape retrofitting of previously developed land**
  - **Ecological restoration of degraded landscapes**

**Opportunity Area Identification Process**

The Chicago Wilderness Sustainable Watershed Action Team (SWAT) engaged in a multi-community analysis of possible green infrastructure opportunity areas. This process was conducted over a 12 month period with multiple meetings within the communities. To best identify Opportunity Areas the project team solicited input from multiple communities. Using an approach similar to past SWAT project in which communities were first instructed about green infrastructure and the Millennium Reserve Green Infrastructure Plan scope. Then they were asked to participate in the development of the map and project concepts. This process included interactive mapping whereby community officials documented projects and issues on a large format map. The meetings, described in more detail above, explored...
the various opportunities within and between communities to improve wildlife habitat, community aesthetics, stormwater management, trail connections; all through green infrastructure techniques.

Of particular interest in the Millennium Reserve area is the number of vacant parcels, as well as those parcels designated as brownfields. Indeed, given the number of foreclosed and underutilized parcels throughout the Millennium Reserve project area, utilizing land acquisition strategies, including the new land banks and the no cash tax bid process, offers a compelling opportunity to strategically develop green infrastructure. Open space and natural area acquisition is one of the principal methods recommended for protection of areas identified in the green infrastructure network map. It is a method that has been used with great success by communities and other open space agencies in protecting land and resources.

Among the largest challenges to the region is the real or perceived number of brownfields, which are contaminated parcels that make development more difficult. Many communities and organizations are working diligently to resolve brownfields through assessment and remediation of these parcels. While brownfields are often targeted for redevelopment as industrial or commercial uses, they also offer tremendous opportunities for green infrastructure amenities. Green infrastructure, including habitat restoration, parks, and other amenities, are viable reuses of chronically underdeveloped sites. Many of the communities within this study are actively acquiring lands through no cash tax bids for redevelopment. The recent development of the Cook County Land Bank Authority and the South Suburban Land Bank and Development Authority offer additional opportunities for redevelopment of brownfields. This project outlines several areas with known or suspected brownfields that could be utilized for redevelopment as green infrastructure.

**OPPORTUNITY AREA DESCRIPTIONS**

This section will discuss green concepts and Best Management Practices (BMPs) that apply throughout the Millennium Reserve study area. Several of these opportunities are targeted at specific sites, while others are more regional in nature. The following sections will briefly summarize a proposed green infrastructure BMP and its benefits.

**Bioswales**

Traditional swales and ditches are constructed adjacent to roads or within rights-of-way to transport stormwater runoff as quickly as possible to their ultimate receiving waters or sewer system without any treatment. With proper design and installation, these swales can be converted into bioswales, also referred to as stormwater swales. Bioswales are vegetated with native plants to promote infiltration of stormwater runoff. This helps recharge groundwater, increases natural flow within creeks and streams, reduces runoff volume to sewer systems, and removes pollutants.
**Stormwater “Bump-Outs”**

Stormwater “bump-outs,” sometimes referred to as street retrofits, are installed as part of road capital improvement projects that involve curb and gutter systems. The curb and gutter system is modified to extend or “bump-out” into the road, also helping to slow but not hindering traffic flow. This creates a green space behind the curb similar to bioswale that stormwater runoff enters through a series of curb and cuts. This water is then filtered before being discharged to storm sewer inlets. It also greatly enhances the aesthetics for both drivers and pedestrians.

**Rain Gardens**

A rain garden is a shallow depression that has a unique soil material which allows for infiltration of stormwater runoff. The soil bed is made up of more granular and sandy soil so water can more easily infiltrate into the ground. Native plantings in the rain garden provide more water absorption and pollutant removal. An underdrain system, overflow outlet structure, and pretreatment filter strip of grass are all additional components that can be incorporated into a rain garden. Giving residents access to tools and programs to install these rain gardens helps get the community involved, can contribute to an increase in land value, and enhance water quality.

**Rain Barrels**

Rain barrels are low-cost, effective, and easily maintained stormwater retention BMP that can be applied to many residential parcels. Rain barrels capture stormwater runoff from rooftops through the downspout and retain this water. The water can then later be used by the resident to water their lawn or garden. This directly involves the community and educates people on the benefits of green infrastructure.

**Permeable Pavement**

Permeable Pavement allows stormwater runoff to be infiltrated through either open spaces in a series of interlocking paver system or by asphalt or concrete with the mixture properties to allow water to pass through it. The runoff would then enter a subbase that is used to retain and infiltrate the water into the soil. Permeable Pavement is capable of being designed to withstand heavy loading from industrial sites.

Permeable pavement has many iterations, each with its own use. Communities and private entities can utilized porous asphalts, permeable concrete, and porous pavers to help minimize stormwater runoff. These strategies are particularly helpful during smaller, more frequent rainfall events. It is important to consider that, like all green infrastructure, even permeable pavements require some regular maintenance. When used appropriate permeable pavement is a dynamic and effective strategy for use in place of more traditional pavements.

**“Stormwater” Trees**

The presence of trees on our city streets helps to slow down and temporarily store water runoff, promotes infiltration, and decreases flooding and erosion downstream. In addition to these stormwater benefits, trees provide a host of other benefits such as improved air quality, reduced air temperatures in summer, reduced heating and cooling costs, increased property values, habitat for wildlife, and recreation and aesthetic value.
Wetland Restoration

Wetland restoration enhances and expands existing wetlands within a specific area. Invasive species of plants would be removed and native plantings would be established.

Excavation for expanding the wetlands would follow the natural topography of the land to minimize construction costs. The expanded areas would be planted with native vegetation. These expanded wetlands would be capable of volume control and may mitigate some of the flooding issues nearby and possibly further upstream.

Stream Restoration

Streams and creeks within areas of poor water quality and low flows are subject to heavy erosion and sedimentation. Invasive species are frequently introduced to these areas and the natural wildlife diminishes. Stream restoration reestablishes the natural environment of the stream and adjacent banks. Invasive species are removed and native plantings are installed to create the intended natural habitat for wildlife. Stream banks can be reshaped and or stabilized with vegetation to help achieve a self-sustaining, functional flow that would not require frequent maintenance.

Complete Streets

Complete streets corridors accommodate multi-modal use and provide for some stormwater treatment, wildlife, and plant habitat. The concept behind a complete street is to utilize the existing right-of-way to install green infrastructure BMPs and promote non-vehicular traffic. Typical complete streets have medians in the center lanes that act as bioswales, painted lanes designated only for bikes or buses, and landscaping along the sidewalks between the street and pedestrians. If space permits it, stormwater “bump-outs” can be incorporated.

Complete streets corridor encourages biking, walking, or public transit while reducing vehicular traffic, essential for decreasing carbon emissions and increasing air quality. A complete street corridor can be done in simple phases such as delineating bike lanes or installing planters along the sidewalk.

Multi-purposing right-of-ways and roads to include stormwater practices, native plants, trees and amenities for the community such as bike trails and walkways are good practices to include in capital reinvestment projects. The funding for road and sidewalk repair also provides a match for municipalities to secure grants for “green infrastructure” projects.
Local Examples for site-based GI

Park Forest Central Park Wetlands Restoration Project: In 2000, the Village of Park Forest began restoring 45 acres of wetlands by converting underutilized park space with chronic drainage issues. This innovative project had provided a natural habitat that is used weekly by schools as an educational resource. The project was so successful that the Village is exploring other similar restoration projects for poorly draining areas.

Blue Island Rain Barrels and Rain Gardens: In the fall of 2012, the city partnered with the nonprofit Metropolitan Planning Council and several other partners to install approximately 125 rain barrels and several native plant gardens at key public sites. The installation of these green infrastructure elements have helped to reduce stormwater runoff in a neighborhood that experienced regular flooding. In 2015 the City will expand this program by adding stormwater bump-outs, rain gardens, and additional rain barrels on a significant level. As part of past efforts, Blue Island obtained more than $1 million to help implement these efforts.

Midlothian Greenway Project: The Village of Midlothian developed the Midlothian Greenway Project to develop connections between neighborhoods, improve community aesthetics, and to address stormwater runoff. This effort began with the Midlothian Creek Green Infrastructure Plan, completed by Chicago Wilderness. Using that Plan as a driver for change the Village then applied for and was awarded an Illinois Green Infrastructure Grant to convert a vacant lot into a permeable parking lot and a rain garden. Match funding for the IGIG project is USEPA Great Lakes Restoration Initiative Funds provided by IDNR’s Coastal Management Program.

SSMMA Calumet River Corridor: The South Suburban Mayors and Managers Association (SSMMA) along with the IDNR Coastal Management Program were awarded Great Lakes Restoration Initiative funding.

LOCAL RESOURCES: SSMMA
South Suburban Mayors & Managers Association developed a website product in 2014 - GREEN INFRASTRUCTURE ONLINE TRAINING. The information and resources provided in this training helps communities become better informed about their role in bringing site-based Green Infrastructure planning and implementation in the community. The site takes you though a course that explains green infrastructure. Sections include: Introduction; Principles; Planning on a Site Scale; Implementation and Course (Green Infrastructure) Resources.

http://review.em-assist.com/courses/ssmma/web/index.html

Also available from SSMMA is an online mapper - the Millennium Reserve Green Infrastructure Viewer:


Of additional use to communities in planning processes - SSMMA GIS:

• Atlas Website - you can explore existing GIS or create your own maps. http://ssmma-gis.maps.arcgis.com/home/index.html

• Open Data Portal - Site provides data about SSMMA region for public use. Data can be previewed as a spreadsheet, shapefile, KML, or linked via API. Open Data Portal: http://ssmmaopendata.smma-gis.opendata.arcgis.com/
to complete planning work and the implementation of green infrastructure on a number for sites along the Little Calumet River and the Cal-Sag Channel. This project includes the communities of Robbins, Riverdale, Calumet Park, Calumet City, Dolton, Blue Island and Burnham. Three project sites have been selected for implementation in 2015. Once complete these projects will provide rain gardens, bioswales and native habitat that offsets stormwater runoff impacts.

South Suburban College: In 2014 South Suburban College was awarded an IEP A Illinois Green Infrastructure Grant (IGIG) to address flooded areas through green infrastructure techniques. This project will utilized native plants to increase the absorption of stormwater runoff and to reduce the need for mowing. The College has indicated an interest in expanding these projects to other sections of the campus.

Match funding came from USEPA Great Lakes Restoration Initiative Funds through IDNR’s Coastal Management Program.

LOCAL RESOURCES: CNT - Center for Neighborhood Technology

CNT and the Army Corps of Engineers have been working with the Village of Midlothian, and Floodlothian Midlothian, to help them develop a RainReady℠ plan to alleviate flooding in the Village. CNT is working on creating a check-list of the range of potential solutions to consider in the RainReady℠ plan that might bring additional economic, environmental and social benefit to the Village. This may include land banks, the creation of bike trails with adjacent stormwater retention, identifying retail opportunities that could use green infrastructure as part of their development strategies and other solutions.

RainReady℠ is an initiative of the nonprofit Center for Neighborhood Technology designed to help individuals, businesses and communities find solutions to the problem of too much or too little water. For information on CNT’s RainReady℠ program with municipal and homeowner actions and tips: http://rainready.org/

CNT’s Green Values® Stormwater Toolbox was originally developed for use by planners, engineers and other municipal staff, but it is also available for individuals are interested in the benefits of green infrastructure, both for individual sites and to influence public policy. It includes a Stormwater Management Calculator and a Chicago DOE Stormwater ordinance Compliance Calculator. Try it out here: http://greenvalues.cnt.org/

LOCAL RESOURCES: Chicago Metropolitan Agency for Planning - Local Technical Assistance Program (LTA)

The CMAP LTA program provides assistance to communities across the Chicago metropolitan region to undertake planning projects that advance the principles of GO TO 2040 and address local issues at the intersection of transportation, land use, and housing, including the natural environment, economic growth, and community development. CMAP staff and the consultants they hire for these integrated processes provide top-notch facilitated community engagement and planning expertise.

http://www.cmap.illinois.gov/programs-and-resources/ita
ADDITIONAL RESOURCES & INFORMATION for Opportunity Area Implementation

There are now many excellent resources for municipalities, local jurisdictions, businesses and homeowners on green infrastructure implementation at a site-based scale, covering everything from dealing with water to providing a sense of place in the community. Here, and throughout the rest of the document, are resources that we have found particularly valuable.

U.S. Environmental Protection Agency - is the go-to place to find the latest information on Green infrastructure. US EPA Provides information on the ways it is incorporating green infrastructure in a number of different agency programs, both regulatory and non-regulatory. US EPA General Information on GI:

http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm

US EPA’s Municipal Handbook Series- “Managing Wet Weather with Green Infrastructure” - provides local governments with a step-by-step guide to growing green infrastructure in their communities. The handbook’s five chapters discuss: funding options, retrofit policies, green streets, rainwater harvesting policies, and incentive mechanisms. Each chapter provides a discussion of available programs and policies and several case studies.

http://water.epa.gov/infrastructure/greeninfrastructure/gi_policy.cfm

Also on the above page, scroll down to: Water Quality Scorecard - This EPA product is a tool that communities can use to collaboratively identify the barriers to green infrastructure in local codes and ordinances. The scorecard guides municipal staff through 230 policies, codes, and incentives that could be adapted to promote sustainable stormwater management. The scorecard also provides extensive references and case studies.

Enhancing Sustainable Communities With Green Infrastructure: A guide to help communities better manage stormwater while achieving other environmental, public health, social, and economic benefits (PDF) (66 pp, 5.3 MB, About PDF) (2014) aims to help local governments, water utilities, nonprofit organizations, neighborhood groups, and other stakeholders integrate green infrastructure strategies into plans that can transform their communities.

http://www.epa.gov/smartgrowth/green-infrastructure.html

US EPA Design Resource Library:
http://water.epa.gov/infrastructure/greeninfrastructure/gi_design.cfm

US EPA General Resource Library:
http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm

Green Infrastructure Center is an organization who’s mission is to assist communities in developing strategies for protecting and conserving their ecological and cultural assets through environmentally-sensitive decisions, lifestyles and planning.

Resources and Publications: http://www.gicinc.org/resources.htm

For Business and Industry:

Vacant Lots and GI
Natural Resources Defense Council: “Greening Vacant lots: Planning and Implementation Strategies”
http://docs.nrdc.org/water/files/wat_13022701a.pdf

And a new retrofit guide just out at time of this publication:

Credit Valley Conservation, located near Toronto, has developed green infrastructure retrofit guides for road rights-of-way, public and institutional lands, business properties, and residential lands. These guides can be found here: http://www.creditvalleyca.ca/low-impact-development/low-impact-development-support/stormwater-management-lid-guidance-documents/


Road Retrofits (livable roads) practices and GI
National Association of City Transportation Officials (NACTO)
Great transportation retrofit ideas for multi-purposing roads with insights and best practices among large cities. Fosters a cooperative approach to key issues facing metropolitan areas. http://nacto.org/
URBAN BIKEWAY GUIDE http://nacto.org/cities-for-cycling/design-guide/

To identify and select native plants for rain gardens and natural areas:
Possibility Place Nursery’s Plant Finder:
http://www.possibilityplace.com/plant-finder/

For homeowners:
Conservation @ Home and Conservation @ Work are programs begun by the Conservation Foundation, that have spread to other counties in the Chicago metro area. See this website for homeowner and business-place information on how to make your own yard a more sustainable place. Includes Info on: Earth Friendly Landscaping, Educational Articles, Solving Problems with Native Plants, Landscaping for Wildlife Rain Barrels and Ways to Save Water.
Tree Information - for Communities, Homeowners, Campuses and Businesses:

Morton Arboretum

With scientific research at home and conservation leadership around the world, The Morton Arboretum works for the future of trees. The Arboretum is home to many resources, and guides local communities, landscapers and individuals in understanding the importance, value and function of community trees. One such example is:

The Northern Illinois Tree Selector

Find trees that thrive in northern Illinois. Select your location, site conditions, and preferences to get a side-by-side comparison for choosing the best tree for your circumstances. All trees found on the Northern Illinois Tree Selector are hardy for zones 5 and 6.

Community Input
Green Infrastructure Descriptions
North Millenium Reserve October 2014

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Public Parks, Preserves & Conservations Areas (with buffer)

Environmental Resource Area:
- Wetlands, floodplain, woodlands, GI connections (with buffer)

Private Open Space (with buffer)

Waterway, Lakes, Streams

Remnant C}
Regional E
Project Concepts

The below project concepts have been vetted by the communities and the consultant support team for potential near-term implementation. These projects are highlighted for their benefits relative to habitat restoration, stormwater reduction, and for aesthetic improvements. Where possible all three factors were integrated into the process. The letters are for reference purposes only, please see the attached maps.

A Butterfield Creek Green Neighborhood Retrofit and Connectivity

- Contiguous with Idlewild Country Club is a Village of Homewood neighborhood that regularly experiences some flooding. The community has indicated an interest in utilizing green infrastructure to mitigate flooding in the area and to provide aesthetic improvements. Elements may include:
  - Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
  - Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
  - Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer;
  - Connectivity to area destinations via on-street trails is also suggested.

B Millennium Park Neighborhood Retrofit and Connectivity

- The Village of Homewood has indicated an interest in retrofitting and connecting, utilizing green infrastructure, a neighborhood adjacent to Millennium Park and Splash Pad. This would improve the aesthetics of the community, provide a safe route for residents to the park, and improve wildlife habitat.
  - Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
  - Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer;
  - Connectivity to area destinations via on-street trails is also suggested.

C Neighborhood Oak Savannah Restoration Project

The Village of Homewood has indicated an interest in mapping and enhancing a former oak savannah area that extends throughout several neighborhoods. This could be integrated with habitat restoration and a comprehensive forestry program and removes non-native trees and replaces them with native oaks.

D Brownfields to Greenfield Pocket Park and Rain Garden

This former gas station site will be converted into a demonstration pocket park and rain garden to offset flooding in the adjacent roadway and to enhance the aesthetics and habitat of the region. This project would include:

- Rain garden with native planting and stormwater runoff controls;
- Park amenities, including benches, walkways, and lighting;

E Prairie Lake Corridor Complete Streets and Connectivity

The Village of Homewood would like to develop a complete streets corridor that connects neighborhoods to multiple popular parks. This would include:

- Early communication with IDOT, CCHD, and local municipalities to incorporate a complete streets design including bioswales, bike lanes, and sidewalks;
- Stormwater “bump-outs” are to be considered through appropriately wide corridors;
- Connectivity to area destinations and regional bike and pedestrian trails;
- Encourage community participation during the planning process.

F-H Neighborhood Rain Garden Program

The Village of Homewood has indicated a need to offset flooding at specific sites throughout one of its neighborhoods. This neighborhood is located within in the Butterfield Creek watershed and would improve water quality in the region. Project elements include:

- Stormwater “bump-outs” are to be considered through appropriately wide corridors;
• Connectivity to area destinations and regional bike and pedestrian trails;
• Encourage community participation during the planning process.

Calumet Country Club Green Neighborhood Retrofit

The Village of Homewood has indicated an interest in retrofitting and connecting, utilizing green infrastructure, a neighborhood adjacent to Calumet Country Club. This would improve the aesthetics of the community, provide a safe route for residents to the park, and improve wildlife habitat.

• Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
• Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer;
• Connectivity to area destinations via on-street trails is also suggested.

Waterway Restoration Project in MWRD Ditch

A waterway managed by the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) runs through portions of various neighborhoods and golf courses within the Village of Homewood, as well as adjacent communities. This stream presents restoration opportunities that could incorporate habitat and other BMP connections into adjacent areas. Elements may include:

• Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
• Streambank stabilization with native vegetation;
• Public access sites with fishing structures.

Homewood Prairie Expansion and Green Development

The Village of Homewood would like to cultivate a native prairie in this neighborhood development. There are open lots and residents that would support this use, making for an innovative project. Project elements would include:

• Stormwater “bump-outs” are to be considered through appropriately wide corridors;
• Yard prairie restoration opportunities, including native plant installation;
• Encourage community participation during the planning process.

Cicero and 147th Street Complete Streets Project

The Village of Midlothian and the Village of Posen have indicated they would like to incorporate a complete streets approach to 147th extending from the I-57/294 interchange to at least Cicero Avenue. This would enhance their business district and create safer routes for vehicles, bicycles, and pedestrians. Elements of this project would include:

• Early communication with IDOT, CCHD, and local municipalities to incorporate a complete streets design including bioswales, bike lanes, and sidewalks;
• Stormwater “bump-outs” are to be considered through appropriately wide corridors;
• Connectivity to area destinations and regional bike and pedestrian trails;
• Encourage community participation during the planning process.

Olympia Fields Green Residential Development Project

The Village of Olympia Fields would like to develop a green residential neighborhood in an area that currently experiencing some flooding. This is adjacent to the Metra rail line and the Olympia Fields Country Club. Elements of this project include:

• Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
• Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
• Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer;
• Connectivity to area destinations via on-street trails is also suggested.

Lincoln Mall Green Commercial Redevelopment Project

The Village of Matteson is seeking a developer for the Lincoln Mall, an active mall that is currently underutilized. They have proposed implementing green infrastructure elements as part of this project to mitigate stormwater runoff impacts to adjacent waterways. This project would include:

• Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
• Rain gardens and rain barrels are effective tools
for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;

- Stormwater tree plantings that increase the canopy and retain additional stormwater; also increase home values and reduce cooling bills in summer;
- Connectivity to area destinations via on-street trails is also suggested.

**Park Forest Public right-of-way Restoration**

The Village of Park Forest is seeking funding to develop an innovative green infrastructure restoration and retrofit program that will minimize flooding in neighborhoods with the Thorn Creek watershed. Multiple large parcels would be restored as large rain gardens and bioswales to reduce flooding and improve water quality. Preliminary engineering has been completed on this effort, but additional engineering and implementation must be completed to finalize the project. Elements include:

- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Stormwater tree plantings that increase the canopy and retain additional stormwater; also increase home values and reduce cooling bills in summer;
- Yard prairie restoration opportunities, including native plant installation;
- Bioswales and expanded stormwater storage areas, including wetland restoration;

**Thorn Creek Estates Green Neighborhood Retrofit**

The Village of Park Forest would like to develop a green residential neighborhood in an area that currently experiencing flooding. This is within the Thorn Creek watershed and adjacent to Cook County Forest Preserve District land. Elements of this project include:

- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Stormwater tree plantings that increase the canopy and retain additional stormwater; also increase home values and reduce cooling bills in summer;
- Connectivity to area destinations via on-street trails is also suggested.

**Green Commercial Development Opportunity**

The Village of Steger wishes to utilize green infrastructure incentives to develop a green commercial corridor that includes improved pedestrian access, native plantings, and other elements that improve connectivity and reduce stormwater runoff. Project includes:

- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Stormwater tree plantings that increase the canopy and retain additional stormwater; also increase home values and reduce cooling bills in summer;
- Connectivity to area destinations via on-street trails is also suggested.

**Bloom High School Green Stormwater Trail Connection**

This corridor would reduce flooding and improve pedestrian and bicycle student connectivity between various neighborhoods and Bloom High School. In addition, the high school could participate by increasing its own green infrastructure elements. Project includes:

- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Multi-modal trail to better and more safely connect students to the school;
- Stormwater tree plantings that increase the canopy and retain additional stormwater; also increase home values and reduce cooling bills in summer;
- Connectivity to area destinations via on-street trails is also suggested.

**Green Development Standards**

A new development is proposed in the Village of Olympia Fields. The Village feels this is an opportunity to develop a green neighborhood from the outset. This would incorporate as many stormwater runoff
reduction green infrastructure options as possible. The Village would then utilize this as a standard for future development opportunities.

**Tolentine Park Green Development**

Tolentine Park is an Olympia Fields Park District facility that could be utilized and enhanced to capture stormwater runoff from adjacent areas. The Village has expressed an interest in developing this as a green infrastructure amenity, utilizing multiple BMPs in adjacent areas to reduce flooding in the area. This project could include:

- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer;
- Connectivity to area destinations via on-street trails is also suggested.

**Scott Drive Blue-Green Complete Streets Flood Mitigation**

Scott Drive is an important local road that connects neighborhoods to various parks and other amenities. It also experiences regular flooding that could be addressed through various green infrastructure practices. This would include:

- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer;
- Connectivity to area destinations via on-street trails is also suggested.

**Peterson Ave Blue-Green Retrofit Drainage Area**

Due to persistent flooding along Peterson Avenue, Sauk Village has suggested a complete streets project that focuses primarily on improved natural drainage systems. This would include:

- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer;
BB 170th Street Blue-Green Project

Due to persistent flooding along 159th Street, Sauk Village has suggested a complete streets project that focuses primarily on improved natural drainage systems. This would include:

- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer;
- Connectivity to area destinations via on-street trails is also suggested.

CC Green Commercial Retrofit and Little Calumet River Stream Restoration

Calumet City proposes to provide green retrofits to areas around the River Oaks Shopping Center to provide aesthetic benefits and reduce flooding. In addition, the adjacent Little Calumet River streambank could be restored to improvement aquatic habitat and functionality, as well as to provide public access in select areas. This project may have elements such as:

- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer;
- Connectivity to area destinations via on-street trails is also suggested.

DD Wentworth Green Neighborhood Retrofit

The neighborhood straddling the Little Calumet River along Wentworth Avenue, both south and north, is located within a designated floodplain and regularly experiences flooding. By incorporating green infrastructure elements into this area Calumet City will help offset flooding damage. This area would incorporate:

- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer;
- Connectivity to area destinations via on-street trails is also suggested.

EE Green Infrastructure Park Enhancement Veteran’s Park

The Calumet City Park District wants to enhance Veteran’s Park to include rain gardens and improved wildlife habitat, making a stronger connection to the Little Calumet. This would include educational elements to highlight the benefits of green infrastructure to this popular park destination. Other aspects include:

- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer;
- Connectivity to area destinations via on-street trails is also suggested.

FF Markham Drainage Ditch Restoration and Habitat Enhancement

The Village of Markham would like to enhance the MWRDGC drainage ditch in their community. This would include:

- Habitat restoration that allows for greater biodiversity of native species;
- Invasive species removal and on-going monitoring in the area;
- Streambank stabilization using native species to reduce erosion;
- Public access points to provide better streamside access for residents.

GG 147th Street Complete Streets Retrofit

The Village of Posen has indicated they would like to incorporate a complete streets approach to 147th extending from the I-57/294 interchange to at least Cicero Avenue. This would enhance their business district and create safer routes for vehicles, bicycles, and pedestrians. Elements of this project would include:
• Early communication with IDOT, CCHD, and local municipalities to incorporate a complete streets design including bioswales, bike lanes, and sidewalks;
• Stormwater “bump-outs” are to be considered through appropriately wide corridors;
• Connectivity to area destinations and regional bike and pedestrian trails;
• Encourage community participation during the planning process.

Midlothian Creek Trail and Waterway Restoration

Adjacent to the Village of Midlothian’s Village Hall is a Metra right of way that could be utilized for native habitat and an important trail connection, providing improved pedestrian and bicycle transportation along Pulaski Avenue. In particular, this could be utilized by Bremen High School students. It would also connect and enhance the transit-oriented development district in Midlothian’s downtown area. Elements could include native prairie plantings, a paved trail, and stream restoration.

Green Neighborhood Retrofit at 147th Street

The neighborhood just south of 147th Street and west of Pulaski Avenue experiences extreme flooding, and is partially located within a designated floodplain. This area sees regular damage by even relatively modest rainfall. By incorporating green infrastructure elements into this area Midlothian will help offset flood damage. This area would incorporate:

• Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;

Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;

• Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer;

Complete Street Trail Connections

This corridor would connect the Oak Forest Heritage Preserve to the Oak Forest Health Center, making a key connection for habitat, pedestrians, and bicyclists in the region. This could include a paved path with native prairie plants on the adjacent rights of way.

Green Industrial Cargo-Oriented Development

The Village of Markham wishes to develop a green cargo-oriented development area out of a current brownfields site. This site is being investigated for development potential and could include many green elements. This may be:

• Renewable energy could offset energy demands typically supported by fossil fuels;
• Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
• Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities; and,
• Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer.
• Connectivity to area destinations via on-street trails is also suggested.

Midlothian Creek Restoration and Green Floodzone Management

The Village of Robbins and the City of Blue Island would like to reduce flooding along 135th Street and Kedzie Avenue to open up select areas for development and to enhance the community aesthetics. This would include significant restoration to Midlothian Creek streambanks, as well as potential park development in a low area referred to as the “bottoms.” The project could provide a major connecting route for pedestrians and bicyclists along Midlothian Creek.
**Green Neighborhood Retrofit and Floodplain Mitigation**

The Village of Robbins would like to establish a green neighborhood corridor in its primary municipal and business district. This area would improve community aesthetics, offset the impacts of blight, and identify productive uses for vacant parcels. In addition, it could include:

- Renewable energy could offset energy demands typically supported by fossil fuels;
- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer; and,
- Connectivity to area destinations via on-street trails is also suggested.

**Green Industrial Park Development, Lake Riverdale Restoration, & Green Canopy Expansion**

The Village of Riverdale is working toward an aggressive blend of green infrastructure techniques to enhance its community, reduce flooding, and decrease its carbon footprint. There are three related, but somewhat distinct efforts.

First, there is a general push to increase the native tree canopy by adding trees throughout the community. These would be native trees appropriate to the historical flora of the area.

Second, the Lake Riverdale area is an amenity that has long been targeted for restoration and improved access. This important bird habitat requires extensive removal of invasive plants and the introduction of native wetland and upland species. Additionally, park-like amenities, including paths, benches, and educational signage are desired.

Finally, a large tract of undeveloped former industrial land between the IHB and the CSX railyards is targeted for development. The Village would like to introduce green standards for management of stormwater runoff. Additionally, renewable and alternative fuels could be used to reduce the carbon footprint of the development. Below are multiple elements that could enhance each of these elements of the communities:

- Renewable energy could offset energy demands typically supported by fossil fuels;
- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;
- Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer; and,
- Connectivity to area destinations via on-street trails is also suggested.

**Needles Park Green Stormwater Neighborhood Retrofit**

The Village of Dolton and the Dolton Park District have indicated this neighborhood experiences some ponding from stormwater runoff. The Village would like to introduce green infrastructure to offset some of the impacts from stormwater, as well as to enhance property values and community aesthetics. In addition, they would like to enhance Needles Park and make stronger connections to the neighborhood. Below are many of the possible green infrastructure techniques that could be utilized.

- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities; and,
- Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer.

**NE Site Green Mixed-Use Development**

The City of Blue Island has developed a mixed-use plan that incorporates light industrial, retail, and open space for its largest remaining undeveloped parcel. This brownfields site has two wetland areas mapped on the National Wetlands Inventory. It is located adjacent to a large neighborhood on the western border, as well as retail and industrial space. The City wishes to utilize green infrastructure to the greatest extent possible as part of the development program for the site. Below are many of the elements incorporated into various planning documents.

- Renewable energy could offset energy demands typically supported by fossil fuels;
• Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;

• Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;

• Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer; and,

• Connectivity to area destinations via on-street trails is also suggested.

Vincennes Neighborhood Green Retrofit

The City of Blue Island is working diligently to offset flood impacts in this large neighborhood by integrating green infrastructure elements to reduce flooding. This neighborhood sits along the edge of a former Lake Chicago spit, as such it is elevated and has unique drainage patterns that cause rapid and frequent flooding. The City would like to implement as much green infrastructure as possible to capture runoff upstream of the most flooded areas. Elements include:

• Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;

• Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities; and,

• Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer.

Kedzie Green Industrial Park

The City of Blue Island and Cook County would like to see this former industrial site redeveloped as a green industrial park. This expansive area has excellent water and road access, with rail access nearby. The goal for this development is to provide sensitive green techniques to offset other elements of development. Portions of the site could be utilized for public amenity, such as a soccer fields. Elements of this development would include:

• Renewable energy could offset energy demands typically supported by fossil fuels;

• Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;

• Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;

• Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer; and,

• Connectivity to area destinations via on-street trails is also suggested.

Markham Green Industrial Development

The Village of Markham would like to develop a green industrial park. This expansive area has excellent water and road access, with rail nearby. The goal for this development is to provide sensitive green techniques to offset other elements of development. Portions of the site could be utilized for public amenity, such as a soccer fields. Elements of this development would include:

• Renewable energy could offset energy demands typically supported by fossil fuels;

• Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;

• Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities;

• Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer; and,

• Connectivity to area destinations via on-street trails is also suggested.

Frogtown Green Stormwater Neighborhood Retrofit

Frogtown is a neighborhood in Calumet City that experiences regular and extreme flooding during even modest rainfall events. The community would like to introduce green infrastructure to offset some of the impacts from stormwater, as well as to enhance property values and community aesthetics. Below are many of the possible green infrastructure techniques that could be utilized.

• Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;

• Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities; and,

• Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer.
Roseland Green Retrofit Neighborhood Improvement

The historic Roseland neighborhood would like to install green infrastructure elements to increase habitat, improve aesthetics, and address some stormwater runoff concerns. Additionally, historic educational signage could be incorporated to highlight the important significance of this development to the region. With Roseland’s proximity to the new City of Chicago Park District amenities nearby, on street and off-road trail connections would provide significant improvements to the region. Below are some elements that could be incorporated:

- Renewable energy could offset energy demands typically supported by fossil fuels;
- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities; and,
- Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer.
- Connectivity to area destinations via on-street trails is also suggested.

South Holland Green Neighborhood Retrofit

This large neighborhood in South Holland experiences some ponding from stormwater runoff. The Village would like to introduce green infrastructure to offset some of the impacts from stormwater, as well as to enhance property values and community aesthetics. Below are many of the possible green infrastructure techniques that could be utilized.

- Bioswales and stormwater “bump-outs” should be installed. This can be implemented during rehabilitation of the roadways;
- Rain gardens and rain barrels are effective tools for business and households to capture stormwater on site and redistribute into the ground or back into gardens. These can also be made to be attractive amenities; and,
- Stormwater tree plantings that increase the canopy and retain additional stormwater, also increase home values and reduce cooling bills in summer.
Coordinate Implementation Between Local Governments, Agencies, and Landowners

One of the central themes of the Millennium Reserve Green Infrastructure Plan is the opportunity, and need, for coordination between the local governments, agencies, and landowners to achieve many of the goals and objectives of the Plan. This is particularly true because green infrastructure resources do not observe political boundaries. A few examples of coordinated planning actions and opportunities follow:

- **Protection of sensitive stream or river resources** is best achieved if all of the communities in a watershed work together to develop consistent ordinances that support sustainable stormwater management and green infrastructure designs for new development and redevelopment. Working with ordinances and education programs, local governments can maximize the opportunity for every drop of water to be treated with green infrastructure practices, such as rain gardens, before it moves offsite.

- Similarly, **prevention and remediation of flooding problems** can benefit by coordinated implementation of green infrastructure. The MWRD has already developed watershed-based stormwater plans and the Tunnel and Reservoir Plan (TARP) to address combined sewer overflow problems. These plans, which rely primarily on traditional grey infrastructure practices, go a long way to solving regional flooding problems. However, green infrastructure implemented on a dispersed basis throughout Millennium Reserve watersheds could further reduce local flooding and drainage concerns, keep water out of basements, and reduce flows into the TARP system that will eventually require pumping and treatment at a wastewater reclamation facility. In addition to local governments, transportation agencies, residents, and businesses can be part of green infrastructure solutions that are described below.

- **A remarkable regional trail and open space network has been planned and largely implemented** under the leadership of the Forest Preserve District, Trails for Illinois, and Illinois Department of Natural Resources. This Green Infrastructure Plan identifies opportunities for municipal and park district trails, bike lanes, and greenways to interconnect to these regional facilities. Connectivity can be further enhanced when new subdivisions, parks, businesses, and commercial developments incorporate local greenways, trail linkages, and bikeways where people live, work, recreate, and shop.
**Implemenation Recommendations**

**Protect Core Green Infrastructure**

There is an array of techniques that can be used to protect, restore, and expand green infrastructure within Millennium Reserve and individual communities. These techniques should be targeted specifically to lands mapped in the green infrastructure network, but also should be used in a dispersed fashion on smaller areas throughout the planning area (e.g., wetlands, woodlands, greenways, etc.) that have local importance. Recommendations are provided for each of the following techniques.

1. Acquisition by public agencies
2. Conservation easements on private land
3. Targeted land use planning and zoning
4. Conservation-based development ordinances
5. Greenway connections
6. Trails, bikeways and water trails
7. Ecological restoration of degraded landscapes
8. Farmland protection

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**1. Acquisition by Public Agencies**

Open space and natural area acquisition is one of the principal methods recommended for protection of areas identified in the green infrastructure network map. It is a method that has been used with great success by the Forest Preserve District of Cook County (FPDCC), Illinois Department of Natural Resources, and other open space agencies in protecting over XXXX acres of open space within Millennium Reserve, including the recent purchase of 282 acres of land adjacent to Lake Calumet and the Calumet Green Manufacturing Partnership.

While the FPDCC and IDNR have been leaders in natural area protection in Millennium Reserve, other entities also play a significant role. Local park districts and departments and the MWRD also have substantial holdings in the core green infrastructure network.

**Recommendations:**

- The FPDCC, IDNR, park districts and municipal park departments, townships, and other state and federal agencies should continue to acquire natural open space, with a priority placed on areas identified in the green infrastructure network map. In particular, these entities should focus on opportunities to protect Environmental Resource Areas that provide connectivity between already protected natural lands.

- Park districts, park departments, municipalities, and townships should identify green infrastructure priorities in their master plans. In particular, they should identify and implement opportunities for protecting local Environmental Resource Areas that are part of the green infrastructure network and educate their constituents about the value of natural resources.

- Where appropriate, open space entities should strive for intergovernmental partnerships to leverage resources and to create “mosaics” of natural communities for protection of plants and animals that require large tracts of land to survive. In particular, assemblages of wetlands, stream corridors, prairies, savannas, and woodlands should be targeted.

- FPDCC, IDNR local park districts, Cook County and other local agencies should coordinate their efforts to promote ecotourism resources, such as parks, natural resources, and similar points-of-interest.

**Resources:** Communities interested in preserving natural areas as public open space should consider the resources of the Illinois Department of Natural Resources (IDNR). IDNR has a long history of working with communities and park districts through its Open Space Lands Acquisition and Development (OSLAD) Program and the federally funded Land & Water Conservation Fund program (LAWCON). Information and application forms are available at: [http://dnr.state.il.us/ocd/newoslad1.htm](http://dnr.state.il.us/ocd/newoslad1.htm).

**Local Examples:**

Open Lands of Orland Park: The Village of Orland Park has long recognized that one of the important reasons people choose to live in the Village is the parks, forest preserves, and open spaces. In an attempt to preserve some of these open spaces, the mayor and Board of Trustees formed an Open Lands Fund in 1995. Its goal was to improve the quality of life by increasing the amount of open space for present and future generations. The Village seeks out public grants and other funding mechanisms, as well as donations from private sources, to acquire open space, which are then...
IMPLEMENTATION RECOMMENDATIONS

protected in perpetuity from development. Open Lands are accessible to the public and offer passive recreational activities such as walking trails. More broadly, the objectives of the Open Lands program are to:

- Preserve critical and sensitive environmental areas
- Provide comprehensive linkage between open spaces
- Add to existing holdings for specific advantages
- Provide wildlife habitat
- Provide additional land in already developed areas
- Improve aesthetic benefits


2. Conservation Easements on Private Land

Privately owned natural areas and open spaces can be voluntarily dedicated for long-term protection under a conservation easement provision. Under this provision, these areas remain in private ownership, but the rights to change the use are given to a controlling agency, usually an entity whose mission includes the protection of open spaces. Conservation easements provide an effective method to preserve open space for future generations.

Another option for private landowners is protection of land through the Illinois Nature Preserves Commission (INPC). Land enrolled in the Illinois Nature Preserves System (either dedicated as an Illinois Nature Preserve or registered as an Illinois Land and Water Reserve) confers the highest level of protection for land in Illinois. The landowner retains title to the property and neither program provides public access to the land. The INPC partners with landowners to protect land that has been recognized for its high ecological value or otherwise serves to buffer or protect such land. Land with high ecological value could include a prairie, woodland, or wetland that has largely survived undisturbed or supports populations of 1 or more of the State’s list of endangered and threatened species. The two land-protection programs available through the INPC provide flexibility in working with landowners who wish to voluntarily protect their land. To date, the Illinois Nature Preserves Commission has enrolled xxxx acres of land in Millennium Reserve into the Illinois Nature Preserves System. The most significant private nature preserves are the holdings of The Nature Conservancy at the Indian Boundary Prairies.

Resources:
For landowners who may be interested in land protection options, Openlands can assist landowners on the options for the Cook County area.
http://www.openlands.org/conservation-easements

The Conservation Tax Center addresses some financial benefits of conservation easements from a national perspective. See: http://www.conservationtaxcenter.org/

Potential financial benefits for landowners who choose to permanently preserve their land with a conservation easement or as a State Nature Preserve:
- Federal income tax benefit: landowners qualify for an income tax deduction equal to the difference between the value of their property with and without an easement. This is treated by the IRS like other non-cash donations to charity, and the landowner can deduct up to 30% of Adjusted Gross Income in non-cash donations and they can carry any unused portion of the deduction forward for 5 years.
- Estate tax benefit: land that is protected with a conservation easement when valued as part of an estate will be reduced in value by 40% (up to $500,000) for purposes of determining any estate taxes owed.

Due to potential changes in federal, state, and local tax laws, some of these benefits may vary over time. In addition, there may be benefits such as reduced property taxes, where a conservation easement reduces the fair market value of the property by, for example, limiting development.

Illinois Nature Preserves Commission staff is available to meet with landowners to describe the land protection programs in greater detail, help assess the ecological value of their land and determine whether their land qualifies for these programs, and help the landowner implement a land-protection program. More information about the State-wide mission of the INPC: http://www.dnr.state.il.us/INPC/index.htm

RECOMMENDATIONS

- Openlands, the Illinois Nature Preserves Commission, and related organizations should continue to identify private land opportunities for protecting critical natural areas, buffers, and connections within and supporting the mapped green infrastructure network.

- Local governments and conservation organizations should continue to educate private landowners and developers about opportunities to set aside land for conservation as well as farmland protection purposes.
Local Examples:

Indian Boundary Prairies: The Indian Boundary Prairies are a cluster of four prairies totaling 370 acres just south of Chicago near the junction of Interstates 57 and 294. According to The Nature Conservancy, which owns and manages the prairies with Northeastern Illinois University, the prairies comprise the largest remaining example of high-quality grassland in Illinois and one of the best in the Midwest. With more butterflies and more plant diversity than almost any other prairie in the state, a portion of the Indian Boundary Prairies has been named a National Natural Landmark by the U.S. Department of the Interior. Nature Conservancy staff and volunteers from the Friends of the Indian Boundary Prairies monitor rare species on the sites, conduct ecological stewardship activities, and conduct tours and other educational activities for the public. For more information, see: http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/illinois/placesweprotect/indian-boundary-prairies.xml

3. Targeted Land Use Planning and Zoning

A number of communities in Millennium Reserve have adopted goals in their land use and comprehensive plans that emphasize wise land use and development decisions that protect green infrastructure. The more forward-thinking plans focus on protection of natural resources and the environment, preserving environmentally sensitive areas, preserving farmland, providing aesthetically pleasing places, and preserving and enhancing existing surface and groundwater resources.

Some of these plans, like the Millennium Reserve Green Infrastructure Plan, further identify and map key elements of green infrastructure, including:

- Existing open space
- Regional and trails
- Greenways
- Wetlands
- Floodplains
- Lakes and streams
- Remnant woodlands
- Prime farmland

One of the primary ways to implement land use policy is through zoning and other ordinances. In that vein, it is important that Cook County and local cities and villages review and revise their zoning, subdivision, and other development related ordinances to be consistent with the policies and recommendations of their land use plans and the Millennium Reserve Green Infrastructure Plan. Ideally, the county, municipalities, and other local governments will work cooperatively to achieve a consistent approach to natural resource protection at local, watershed, and regional scales.

RECOMMENDATIONS

- Cook County, municipalities, townships, and other local governments should develop local green infrastructure maps and plans consistent with the principles and mapping of this plan. The development of local green infrastructure maps should consider small-scale opportunities for resource protection and greenways.

- Local governments should incorporate green infrastructure elements into their land use plans and zoning maps, with a priority on protection of critical natural resources, open space, and linked greenways.

- Local governments should link development and redevelopment priorities to natural resource constraints and opportunities, particularly streams, lakes, floodplains, wetlands, and woodlands. Development should be avoided in the most sensitive natural resource areas.

- Tools such as overlay protection districts should be implemented to clearly identify sensitive areas where development intensities should be limited. Overlay districts can be structured to provide advance knowledge of site constraints to developers as well as to identify creative design techniques such as lot clustering and conservation development (discussed below).

- The Will-South Cook County Soil and Water Conservation District (SWCD) should utilize the
Milennium Reserve green infrastructure maps as it advises local governments, private land owners, and agricultural producers on natural resource issues. In particular, the SWCD should incorporate green infrastructure maps in its Natural Resource Information reports for all zoning and land use changes that it reviews.

**4. Conservation-based Development Ordinances**

Conservation-based development employs a combination of creative land planning and innovative stormwater management practices to protect water and natural resources, preserve natural areas and open space, and enhance wildlife habitat. In the context of this Plan, this recommended approach accompanies strategies known as low impact development (LID) and conservation design. The objectives recommended here can be accomplished through different approaches, ranging from updates to traditional development codes – zoning, subdivision, stormwater, and landscaping ordinances – to the adoption of stand-alone conservation design ordinances.

The recent adoption by the Metropolitan Water Reclamation District (MWRD) of the Watershed Management Ordinance provides for protecting natural hydrology and water quality from the adverse impacts of development throughout Cook County. This ordinance, which requires compliance by local governments throughout Cook County, also offers new protections for floodplains, riparian areas, and isolated wetlands. [https://www.mwrd.org/irj/portal/anonymous/management ordinance](https://www.mwrd.org/irj/portal/anonymous/management ordinance)

In contrast to this notable improvement in stormwater management requirements, in most communities the related development ordinances are out of date. For example, it is common to find incompatibilities between advanced stormwater ordinances and outdated zoning, subdivision, and landscaping codes. In particular, it is recommended that local development codes be evaluated and updated regarding their provisions for natural area protection, natural landscaping standards, impervious area reduction, and standards that recognize and incentivize creative designs for parking lots and roadways, such as permeable paving, bioswales, and rain gardens.

For communities with relatively large green spaces remaining to be developed, a holistic conservation design ordinance is recommended. Conservation design entails a thorough review of a development site to evaluate potential green infrastructure elements – such as wetlands, streams, woodlands, and steep slopes. But where the traditional land planning process may search for ways to “squeeze” or build through these natural areas – resulting in loss and fragmentation of natural resources -- conservation design seeks out creative approaches to preserve and enhance them. A core tool of residential conservation design is “clustering” around natural areas – i.e., accommodating the same number of houses onto smaller lots. This results in less fragmentation of natural areas, reduced land grading and associated infrastructure construction, and more functional open space.

A conservation design ordinance offers local governments a valuable tool to protect sensitive areas, establish greenway and trail connections, and provide for long-term enhancement and stewardship of ecologically important lands. Effective conservation design also incorporates legal, financial, and ecological management provisions for the long-term protection and stewardship of natural areas within a conservation development.

To assist local governments in reviewing and updating their ordinances for consistency with green infrastructure principles, a comprehensive ordinance checklist (developed...
Local governments should use the ordinance checklist

- **RECOMMENDATIONS**

- Local governments should use the ordinance checklist in the Appendix to review and revise their local zoning, subdivision, landscaping, and stormwater ordinances to encourage and/or require low impact development approaches, consistent with the new stormwater requirements of the Watershed Management Ordinance.

- Further, local governments should review and amend their codes to incorporate adequate protections for natural resource areas identified in the green infrastructure network map. In particular, protections for remnant woodlands and other natural areas should be provided.

- The County and communities with the potential for development of green spaces should consider the adoption of conservation design ordinances or natural area overlay districts. These ordinances should be applied to both residential and nonresidential development and should be targeted to all development parcels that include areas mapped in the green infrastructure network.

- Ordinances for conservation design or natural area overlay districts should build upon the successful ordinances adopted by McHenry County and several municipalities that are cited below. These ordinances should incorporate provisions for:
  - A minimum percentage of open space that is correlated with the underlying zoning density. Generally, open space should be preserved or restored to a natural condition.
  - An open space management plan that includes a permanent legal mechanism and includes the identification long-term ownership and funding options. It also should specify clear performance criteria for short- and long-term management of open space natural areas.
  - A land planning approach, such as the clustering of residential lots, to avoid sensitive natural areas and minimize land disturbance and grading.
  - Protection of significant native tree groupings on the site, particularly native oaks and hickories.
  - The County and local governments should encourage or require the dedication of natural areas and open space that is protected through development ordinances to qualified conservation organizations, land trusts, or public land agencies to ensure their long-term protection and stewardship as part of the green infrastructure network.

- Additional resources on conservation design:
  - Conservation Design Ordinances: Some of the most comprehensive conservation design ordinances in the region were developed in McHenry County. The City of Woodstock was the first community in McHenry County to adopt conservation design standards as part of its Unified Development Ordinance. The County subsequently adopted its own ordinance based, in part, on the approach taken by Woodstock. More recently, the Village of Algonquin and City of Crystal Lake have incorporated conservation design requirements into their ordinances, largely modeled after the County ordinance.
    - McHenry County Conservation Design is an addendum to the county UDO - Subdivision Standards - Article 19, page 268: [https://www.co.mchenry.il.us/home/showdocument?id=35441](https://www.co.mchenry.il.us/home/showdocument?id=35441)

**Local and Regional Examples:**

Conservation Design Ordinances: Some of the most comprehensive conservation design ordinances in the region were developed in McHenry County. The City of Woodstock was the first community in McHenry County to adopt conservation design standards as part of its Unified Development Ordinance. The County subsequently adopted its own ordinance based, in part, on the approach taken by Woodstock. More recently, the Village of Algonquin and City of Crystal Lake have incorporated conservation design requirements into their ordinances, largely modeled after the County ordinance.

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5. **Greenway Connections**

A greenway refers to public or private open space that is concentrated in a linear manner along a natural or artificial corridor. Greenways can provide connectivity between adjacent natural areas, provide buffers for linear features such as streams, and sometimes serve as corridors for recreational or trails.

In the creation of the green infrastructure network map, a number of greenway corridors were mapped along existing stream and river corridors and regional trails, such as the Burnham Greenway Trail System. In addition, advisors from natural resource agencies and organizations identified numerous potential connections between existing open spaces and mapped natural areas. Protection and enhancement of greenway opportunities can be achieved by a variety of mechanisms including public acquisition, conservation easements, developer donations, natural landscaping, and ecological stewardship.

**RECOMMENDATIONS**

- The County, local governments, park districts, the FPDCC, Openlands, and other open space organizations should collaborate to link local parks and open spaces to existing and planned portions of the Millennium Reserve green infrastructure and open space networks.

- The FPDCC and local park districts and departments should be leaders in establishing new and expanded public greenways, particularly along the Cal-Sag Channel, Calumet River, and their tributaries. Where appropriate, the organizations should collaborate with the MWRD to improve public access and ecological functionality to MWRD land holdings.

- Local governments should identify and utilize a suite of creative greenway preservation tools such as linkages identified in land use plans, intergovernmental agreements, community buffers, and natural areas protected via conservation developments and natural resource overlay districts.

- Local governments should encourage the interconnection of open space and greenways during the zoning and subdivision approval process. Further, they should work with land owners and developers to encourage the permanent preservation of greenway connections to provide opportunities for habitat enhancement, recreation, and environmental education.

- Local governments and open space organizations should work with their counterparts in Will County and Indiana counties to make greenway connections across regional boundaries.

- Local governments, in cooperation with conservation organizations like Openlands should identify and offer incentives for private landowners to donate lands (or cash in lieu of land) or conservation easements to protect important greenways such as stream corridors.

- Greenway planning and preservation entities should promote public awareness and provide technical assistance regarding greenway protection to private landowners and homeowners associations.

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6. **Trails, Bikeways, and Water Trails**

Trail connectors are key elements of the green infrastructure network. Trails are the primary facilitator of time spent in nature in America’s urban areas, and in Illinois trails are the most desired recreational and non-motorized transportation amenity. They promote active communities, improve health and well-being, link communities and open spaces, and connect people to schools, jobs, and commercial centers. The Plan maps the regional trail network and promotes the development of an interconnected network of non-motorized trails. It advocates access for a variety of users, including pedestrians, bicyclists, and equestrians where appropriate. It also supports implementation of an expanded water trails system for non-motorized watercraft.

Much like greenways, successful trail planning and implementation requires extensive coordination between local governments, open space agencies, regional planners, transportation agencies, and private landowners and developers. With the leadership of IDNR, Openlands, Trails for Illinois, the FPDCC, the Active Transportation Alliance, and others, efforts within the Millennium Reserve to implement regional trail...
corridors have been very successful. Notable examples are the Burnham Greenway Trail System, the Cal-Sag Trail, the Old Plank Road Trail, and the Thorn Creek Trail. Through these trails, the region connects to the 500-mile Grand Illinois Trail, creating the opportunity for overnight trail-based tourism. In addition, the 4700-mile American Discovery Trail traverses the Millennium Reserve by utilizing the Pennsy Greenway, Thorn Creek Trail, and Old Plank Road Trail.

RECOMMENDATIONS

Walking and Biking Trails:

The County, local governments, Cook County Highway Department, FPDCC, Chicago Metropolitan Agency for Planning (CMAP), Openlands, SSMMA, IDNR, IDOT, Trails for Illinois, and other agencies should continue coordinating their efforts to plan and implement trail corridors and circuits throughout the Millennium Reserve, as well as interstate connections to Indiana, to provide effective, safe connections between communities and existing and future open space areas.

Representing regional consensus, trail connections within the Millennium Reserve identified in the Chicago Trails Plan, South Suburban Bicycle & Pedestrian Plan and the Northeast Illinois Regional Trails & Greenways Plan should receive priority in trail development efforts. A formal process for including new trails in the plans should be clarified for local agencies to accommodate both new opportunities and changes that affect existing recommendations.

- Local governments should promote, incentivize or require connecting new residential and commercial development to local and regional trails within their land use approval process.

- Municipalities should promote and plan for walking and biking throughout their communities, including improving the safety, accessibility, and convenience of non-motorized travel.

- When looking for project funding, trail planners and implementers should cast widely for resources, beyond the traditional federal transportation programs. In recent years, tens of millions of dollars from public health agencies and health-related industry, such as health insurance companies, have funded non-motorized transportation plans, facilities and amenities in the Chicago area. Examples such as The 606 and the Cal-Sag Trail demonstrate private interests funding public trails.

- While identifying and appealing to non-traditional trail funding sources is critical to complete an interconnected trail network in the Millennium Reserve, trail planners and implementers lack the experience and capacity to do so. The Chicago Metropolitan Agency for Planning and IDNR should partner with area non-profits working in trails and greenways to bring non-traditional trail funding sources to the table. They should also develop workshops to expand local agencies’ ability to leverage non-traditional funding for trail development.

- In the identification of priority trail corridors, planners should identify riparian, utility, and abandoned rail line corridors as multiple use greenway opportunities to accommodate trails, wildlife corridors, and vegetative buffers.

Water Trails

- Local governments, park departments, and FPDCC should utilize the Northeastern Illinois Regional Water Trails Plan as a guide in the development of a network of stream and river canoe access facilities. Water trails planning efforts should be coordinated with similar efforts in northwest Indiana, particularly for the Calumet and Grand Calumet Rivers.

- Coordinated efforts should be undertaken to expand opportunities and eliminate constraints to expanded water trail access. Improving the Calumet Trails: a Vision for Action is the recommended framework for continued engagement of local and regional organizations and agencies to meet these water trail objectives. Where appropriate, multi-objective approaches that benefit aquatic habitat, water quality, flood relief, and paddling access should be pursued.
Local Examples:

- **Old Plank Road Trail:** This multi-use trail extends across 21 miles of Cook and Will Counties mostly following an abandoned railroad right-of-way. Along the trail are remnant natural areas, particularly prairies, which are managed to enhance their ecological integrity. Implementation of this trail resulted from remarkable collaboration between several units of local government, the Friends of the Old Plank Road Trail, and the Forest Preserve District of Will County. In particular, the communities of Frankfort, Matteson, Park Forest, and Rich Township were instrumental in making this trail happen. See: [http://www.reconnectwithnature.org/resources/onlinefiles/preservefiles/FPDWC_OldPlankRoadTrailBrochure-2012.pdf](http://www.reconnectwithnature.org/resources/onlinefiles/preservefiles/FPDWC_OldPlankRoadTrailBrochure-2012.pdf)

- **Cal-Sag Trail:** The 26-mile Cal-Sag Trail spans 14 communities from Burnham in the east to Lemont in the west. The trail went from an idea over pizza to full federal funding and the start of construction in just 10 years, half the time typical of other regional trails in the Chicago region. The secret sauce: 1) a commitment by the 11-member Coalition to work across lines of jurisdiction, race and class to build one trail, not 11 connecting trails; and 2) the formation of a complimentary Friends of the Cal-Sag Trail organization who carried the water for promoting the cause and finding partners and funding to help all communities connect to the trail. See: [http://calsagtrail.org/FOCST/](http://calsagtrail.org/FOCST/).

7. **Ecological Restoration of Degraded Landscapes**

The Millennium Reserve region contains some high quality natural areas. Most of the best areas are mapped as Illinois Natural Area Inventory (INAI) sites and are protected and managed by the FPDCC and The Nature Conservancy. However, most of the Millennium Reserve landscapes and natural areas have been greatly altered since the beginning of settlement by Euro/Americans in the 1840s. Notably, large areas of former wetlands have been drained, largely to facilitate agricultural production and urban development. Similarly, the region has lost the majority of its original oak-hickory woodlands and savannas. Only a tiny fraction, less than 1 percent, of Illinois’ original prairies have survived intact.

While these losses are a cause of concern, they also present opportunities for restoration and expansion of existing green infrastructure. With respect to wetland restoration, there have been very successful projects involving the removal of subsurface drainage tiles and closing of drainage ditches in altered “hydric soils”.

These actions restore the hydrology, or natural water saturation and inundation conditions, thereby allowing native wetland vegetation and wildlife to return. The mapping of the green infrastructure network includes several large areas of drained organic soils in the vicinity of small, fragmented wetlands. This situation presents and ideal opportunity for the restoration of “basin marshes” and “sedge meadows” that can attract waterfowl and enhance the storage and cleansing of runoff. Similarly, the green infrastructure network...
identifies thousands of acres of altered floodplains and stream and wetland buffers that present an important opportunity for the re-introduction of native vegetation to cleanse water and enhance wildlife habitat.

Woodland/savanna restoration can be a more challenging task, and it can take many years to re-establish woodland that has been cut down. Nonetheless, woodland replanting and restoration are can have substantial benefits if undertaken in the vicinity of remnant woodlands that are in good ecological condition. For example, planting oaks in a residential neighborhood or open space that borders an oak-hickory woods can effectively expand the habitat for certain bird and mammal species that need extensive native tree cover and travel corridors between wooded remnants.

RECOMMENDATIONS

- FPDCC, park districts, and other local governments should target opportunities for ecological restoration of degraded landscapes in their comprehensive plans, with a particular focus on areas within the green infrastructure network and within identified greenway corridors.
- FPDCC, Openlands, relevant state and federal agencies, and watershed groups should provide technical and policy assistance to local governments and landowners to identify and implement opportunities for landscape restoration.

Local Examples:

Orland Grassland: On the southwest side of Orland Park, this 960-acre FPDCC preserve has undergone a remarkable transformation in recent years. This makeover was inspired by a local group, the Orland Grassland Volunteers. A coalition of supporting agencies and organizations was assembled to plan a large-scale restoration. The coalition included the volunteers, the FPDCC, the Village of Orland Park, Chicago Audubon, and Openlands. They were successful in obtaining $12.6 million in funding from the U.S. Army Corps of Engineers to restore the core of the site, including prairie, wetlands, and oak savanna remnants. Restoration efforts included removing artificial drainage to restore wetlands, replanting former farm fields to prairie vegetation, and removing mostly non-native trees and brush to open up the landscape. Ongoing stewardship of the site, involving prescribed burns, seed collection, and treatment of remaining invasive species, is being

Resources:

Communities and landowners desiring to undertake ecological restoration projects should make sure they have a firm grasp of effective practices. For example, clearing invasive brush without proper attention to brush re-sprouts, herbaceous weeds, and the need to re-seed cleared areas can actually worsen the problem over time. Chicago Wilderness has developed several policy papers on ecological restoration and management, addressing the following topics:


The Illinois Nature Preserves Commission has developed detailed Management Guidelines for natural area restoration and stewardship, including recommended control techniques for various invasive species. See:


There are also a number of qualified contractors that can assist in designing and conducting restoration projects. The Natural Resources Conservation Service provides a contractor list for northeastern Illinois – http://www.nrcs.usda.gov/wps/portal/nrcs/detail/il/plantsanimals/?cid=nrcs141p2_030710

There are a number of financial incentive and grant programs for ecological restoration projects. A comprehensive summary of grants for conservation projects can be found at:

undertaken by volunteers and FPDCC staff. Already, the restoration has resulted in the return of a number of uncommon grassland bird species such as Henslow’s sparrow, bobolink, dickcissel, field sparrow, eastern meadowlark. The FPDCC also is working on a five-mile asphalt bike path that will circle Orland Grassland and provide opportunities for connections to community trails. See: http://fpdcc.com/orland-grassland/.

Central Park Wetland Restoration, Park Forest: The Village of Park Forest began the process of restoring a 45 acre wetland site at its Central Park in early 2000. This site is part of a 90 acre park site and sits in the very center of the community. The historical wetland on the site was drained in the 1960s in the hopes of converting it to traditional turf grass recreational uses, such as playing fields. During the early 1990s Village officials began to discuss restoration of the wetland as possibly the best treatment of the 45-acre parcel. The South Suburban Mayors and Managers Association’s (SSMMA) Stormwater Strategy Committee selected the Central Park site as a Watershed Demonstration Project. After developing a wetland restoration plan, the drain tile system was retrofitted to back up water into the historical wetland. Through a variety of grant programs, an active volunteer force and partnerships with a number of resource organizations, the Village now considers the restoration program a huge success. See: http://www.vopf.com/index.aspx?NID=307

8. Farmland Protection

While this Plan is not specifically focused on the protection of farmland, it does recognize that farmland protection can be valuable to the conservation of green infrastructure and water resources. The CMAP GoTo 2040 Plan supports the long-term protection of the most productive farmland in the region. It also encourages new development that is relatively compact and contiguous to existing infrastructure, thereby consuming less farmland and preserving natural resources.

Sustainable farming operations can provide wildlife habitat and natural areas within their land holdings. These areas serve a vital function in maintaining the populations of wildlife such as deer and fowl and as links between larger areas of open space that connect different wildlife populations. Protection of agricultural zones also can help protect the surface and groundwater resources, and can provide recreational opportunities such as bird watching, bicycling, scenic walks and drives, hunting, snowmobiling.

Several programs, operated by the U.S. Department of Agriculture’s Natural Resources Conservation Service (NRCS), are particularly valuable in promoting farmland protection and ensuring the preservation of natural resources in agricultural areas. The Conservation Security Program (CSP) and Environmental Quality Incentive Program (EQIP) provide financial and technical assistance toward the conservation and enhancement of soil, water, air, energy, plant life, and wildlife on private working lands. The Conservation Reserve Program (CRP), administered by the U.S. Department of Agriculture (USDA) Farm Service Agency (FSA), is utilized by producers within the County to minimize soil erosion and reduce surface water sedimentation and contamination.

NRCS and the Will-South Cook Soil and Water Conservation District (SWCD) offer local and community support for agriculture and resource protection through several related programs. The Land Evaluation and Site Assessment (LESA) program, county soil surveys, and Natural Resource Inventories (NRI) help identify “best” uses of land, identify soil limitations, and map prime farmland soil types. More recently, the Will–South Cook SWCD ventured to re-invigorate farmland preservation efforts by exploring opportunities to trade or purchase development rights from individual landowners.

There is a growing movement to support “local food” through urban farming and community gardens. CMAP has been at the forefront of identifying municipal strategies for local food through comprehensive land use plans and urban agriculture ordinances. Beyond the local food benefits, these types of initiatives help preserve or restore permeable, functioning landscapes that help maintain water infiltration, reduce stormwater runoff and basement flooding, and reduce urban heat island effects.
RECOMMENDATIONS

• Farmers with property within or nearby the green infrastructure network are encouraged to implement natural resource conservation and restoration programs and seek assistance from initiatives such as the USDA Conservation Security and Conservation Reserve Programs.

• The USDA Natural Resources Conservation Service and Will-South Cook County Soil and Water Conservation District are encouraged to continue offering educational programs regarding best soil conservation practices, habitat protection, and improving rural and urban water quality.

• Farmers are encouraged to apply of best management practices to minimize soil disturbance and compaction and to help maintain biodiversity.

• Local governments are encouraged to work with CMAP, NRCS, Will-South Cook County SWCD, and other organizations to develop policies, plans, and ordinances to protect farmland and to expand opportunities for urban farming and community gardens.

Invasives control information and help:
The Northeast Illinois Invasive Plant Partnership (NIIPP) is a regional organization that brings together interested landowners, land managers (private, city, county, state, and federal), non-profits, private entities, industry, special districts, and the public in the northeastern Illinois region for the purpose of coordinating and combining their resources, expertise, and activities for more efficient and effective management of invasive plant species across jurisdictional boundaries. It’s mission is to prevent and control new plant invasions, control and manage current invasions, support informed management decisions, and raise public awareness concerning the threat posed by invasive plants. For invasives fact sheets in English and Spanish, herbicide information and other see: http://www.niipp.net/control-management

Local Examples

Chicago Advocates for Urban Agriculture (AUA):
Chicago AUA is a coalition that supports sustainable urban agriculture and community gardens in the Chicago area. They have developed a web-based Urban Agriculture Resource Guide and an online Urban Agriculture Directory that lists dozens of urban farms and gardens in and around Chicago. http://auachicago.org/resources/chicago-urban-agriculture-directory/

City of Chicago Urban Agriculture Zoning:
Recently adopted changes to the Chicago Zoning Ordinance allow agricultural uses like community gardens and urban farms in many parts of the city. The zoning amendments define community garden and urban farm uses, identify where each use is permitted, and establish regulations designed to minimize potential impacts on surrounding property and help maintain the character of Chicago’s neighborhoods. More information is available through the City’s Department of Planning and Development: http://www.cityofchicago.org/city/en/depts/dcd/supp_info/urban_agriculturefaq.html

Resources:
Will-South Cook Soil and Water Conservation District (SWCD) supports a number of agricultural conservation programs. These include wildlife habitat incentives, nutrient management planning, and conservation reserve and practices programs. http://www.will-scookswcd.org/
CMAP has developed a guide for Municipal Strategies to Support Local Food Systems. The guide provides technical assistance on promoting urban agriculture via land use plans, recommendations for urban agriculture ordinances, and a wealth of regional and national resources. http://www.cmap.illinois.gov/livability/local-food/model-food-ordinance

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A number of local colleges and universities – including DeVry University, Governors State University, Moraine Valley Community College, Northwestern College, Prairie State College, Saint Xavier University, and South Suburban College -- have campuses in or near the Millennium Reserve planning area. Several have been active participants and meeting hosts during the green infrastructure planning process. All of these colleges are members of the South Metro Higher Education Consortium (SMHEC) and participate on SMHEC’s Sustainability Task Force.

Because of their ongoing support of sustainability initiatives and considering the important influence they have in their communities, it is evident that these institutions can play a central role in disseminating and implementing the green infrastructure plan. This can happen by:

- Practicing green infrastructure – being a role model.
- Teaching it – training students and professionals.
- Promoting it – engaging the community in conversations and forums.

**GI demonstration sites:** The campuses of most local colleges are highly visible in their communities. Implementing demonstration projects of GI (e.g., permeable paving, natural landscaping, green roofs, bioswales, etc.) could expand awareness and acceptance in neighboring areas. In particular, the colleges could host tours and workshops for surrounding communities and businesses. For some projects, grant money from government agencies or foundations may be available to help offset the costs of these demonstration projects.

**Local Examples:**

SMHEC is planning a 2015 Green Infrastructure Seminar Series for its members, regional municipalities, businesses and non-profit organizations to promote understanding and encourage the use of best practices in stormwater management. Member campuses utilizing these best practices will host these seminars. Moraine Valley Community College, Kankakee Community College, Governors State University, and Lewis University have native prairie or wetland restoration projects. Lewis University is actively managing and monitoring its storm water through the use of bioswales, rainwater harvesting, permeable pavers, native landscaping, tree planting and detention ponds. Joliet Junior College has installed bioswales and native landscape, restored prairies and woodlands, hydraulically dredged their lake to provide better water quality, and installed vortex separators at inlets to the lake to mitigate sediment in runoff.

**Habitat corridors and hubs:** Many colleges have significant natural open space and/or border existing natural areas, stream corridors, or forest preserves. The natural areas could be restored (e.g., cleared of invasive species) and vacant areas replanted as prairies to serve as habitat corridors and buffers. These restorations also can be used as living laboratories for classes in landscaping or ecology.

**Local Examples:**

Governors State University (GSU) is the “missing link” between the Thorn Creek Woods Nature Preserve, the Thorn Creek Headwaters Preserve, and other public open space. With work currently being done on its campus GSU will be the habitat corridor between those sites. GSU and Prairie State College also are actively working with the Thorn Creek Watershed group to restore their stream corridors and identify site specific best management practices to reduce pollutants.

**Trail hubs and connectors:** The Millennium Reserve has a remarkable network of regional trails, Forest Preserve trails, and community bikeways. A core recommendation of this Plan is to expand and add connections to regional trails via community and neighborhood trails. Because of their centralized locations, college campuses may be ideal locations for trail routing and hubs, in cooperation with park districts, communities, and trail advocates. Some of the benefits include improved access to campuses, improved health outcomes for students and faculty, and reduced vehicular traffic.
Local Examples:

The 100 mile Southland Century Trail is in the middle of the SMHEC region. A number of SMHEC institutions have expressed interest in connecting to the existing trail systems. Moraine Valley Community College, Lewis University, and Joliet Junior College have trails throughout their campuses. GSU has a campus trail system winding through its nationally renowned Nathan Manilow Sculpture Park.

GI curricula and job training: Colleges could expand their curriculum offerings related to GI planning, design, construction, and maintenance. For example, there is a dearth of training on sustainable stewardship of native landscapes. Students earning degrees or certificates could provide a labor source to regional contractors and open space agencies. Partnerships with industry groups like Midwest Ecological Landscaping Alliance (MELA) and the Corporate Council of Chicago Wilderness are currently being explored. Partnerships with groups like Greencorps Chicago could be initiated or expanded. For example, experts from private consulting firms or public agencies could potentially serve as instructors and adjuncts.

Local Examples:

SMHEC has collaborated with the Midwest Ecological Landscaping Association (MELA) and Chicago Wilderness partners to evaluate the viability of a native landscaping certificate and will continue to work with a variety of partners to investigate and establish, when appropriate, curriculum related to green infrastructure. South Suburban College offers a Green Construction certificate program. SMHEC also participates with the Calumet Green Manufacturing Partnership (CGMP) which is a collaborative initiative to enhance the manufacturing industry in the Calumet Region of Illinois. The CGMP develops the skills of the local workforce to meet the labor needs of Calumet region manufacturing companies, with an emphasis on green skills, industries and manufacturing practices.

Policy forums: Colleges can host community forums for students, residents, businesses, and local government officials on GI topics. Topics could include policy matters such as cost-effectiveness, climate change resiliency, and community benefits. These forums could highlight the green infrastructure accomplishments of the colleges and help bridge the lack of awareness or skepticism that may currently exist in some communities.

Local Examples:

Annually SMHEC offers a Sustainability Conference to discuss topics of mutual interest to its members. The 2014 SMHEC Sustainability Conference at Joliet Junior College for the first time engaged colleges businesses, non-profits, and community officials in conversations and information sharing. The 2015 Conference theme will focus on green infrastructure. SMHEC is working with the Millennium Reserve to bring green infrastructure concepts to the Millennium Reserve planning area.
ADDITIONAL REFERENCES AND LINKS


McDonald RI (2013) Implications of urbanization for conservation and biodiversity protection. Encyclopedia Biodivers 7:304-313


The Chicago Wilderness
Millennium Reserve
Green Infrastructure Project