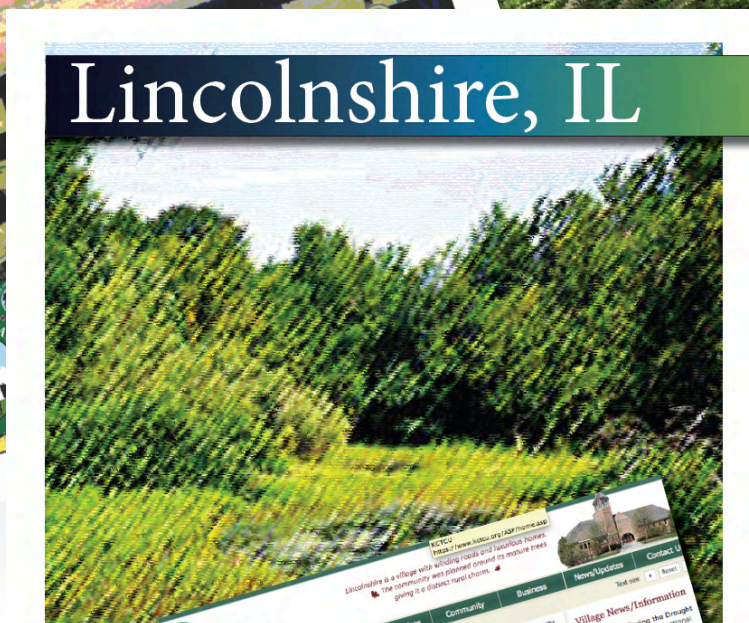


June 2013

Green Infrastructure Planning across Three Communities

Chicago Wilderness

Sustainable Watershed Action Team (SWAT)



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Acknowledgements:

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For more information about Chicago Wilderness and our initiatives go to: <http://www.chicagowilderness.org/>

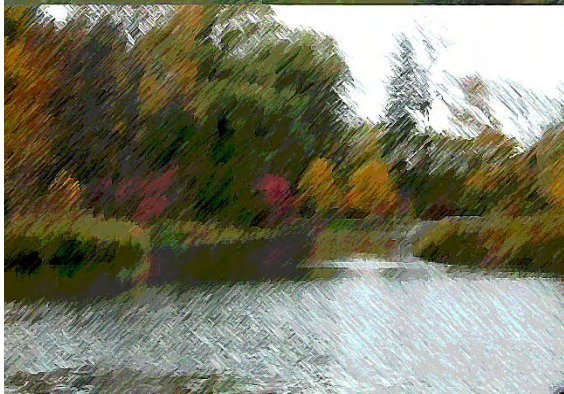


GREENING Infrastructure
An Initiative of Chicago Wilderness



GREENING *Infrastructure*

An Initiative of Chicago Wilderness



In 2011 Chicago Wilderness (CW) began a green infrastructure planning process, funded by the Grand Victoria Casino Foundation, which continued implementation of Chicago Wilderness's Green Infrastructure Vision through its Sustainable Watershed Action Team (SWAT) initiative. The grant funded three projects, one of which is the subject this document - a collaborative green infrastructure planning effort for the three villages of Lincolnshire, Bannockburn and Mettawa.

The goals and work product from this grant were defined to include:

- A green infrastructure map for the three communities;
- A description of green infrastructure and its benefits;
- Recommendations to strengthen ordinances to promote and protect green infrastructure objectives.

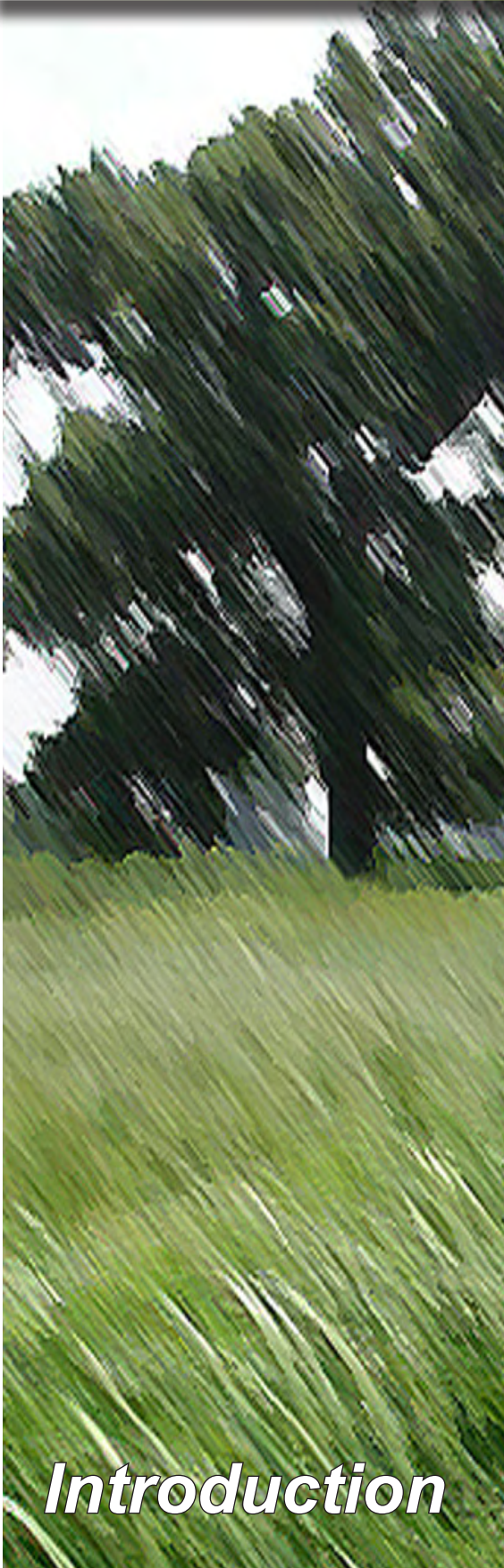
This report is a summary of the process and findings for this project. It has been a pleasure to work with the three communities of Bannockburn, Mettawa, and Lincolnshire in this green infrastructure process.

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Chicago Wilderness is a regional alliance that connects people and nature. 270 diverse organizations, businesses, and government agencies work together to restore local nature and improve the quality of life for all living things by protecting the lands and waters on which we all depend.

Gray Infrastructure, Green Infrastructure?



Introduction

Webster's New World Dictionary defines infrastructure as the substructure or underlying foundation . . . on which the continuance and growth of a community or state depends. Random House defines infrastructure as the basic, underlying framework or features of a system, as the . . . communication and transport facilities of a country.

We are used to thinking of infrastructure in terms of built public works systems – roads, sewers, utilities, etc. – our gray infrastructure. We are less inclined to think of our natural resource systems – woodlands, grasslands, wetlands, streams, parks, trails – as our green infrastructure. This is partly because the purpose and value of roads and sewers, for example, are so clearly defined and understood, while the purpose and value of wetlands along a stream, for example, are less well understood, and therefore, less appreciated.

Benedict and McMahon elegantly define green infrastructure as ***an interconnected network of green space that conserves natural ecosystem functions and values and provides associated benefits to human populations.*** These functions and values include: groundwater infiltration, water quality, wildlife habitat, biodiversity, building soils, etc.

All green space, however, is not equal. Some green spaces do a better job of infiltrating water into aquifers; some provide better water quality benefits; some green spaces are highly erodible; some green spaces are particularly adept at building soils.

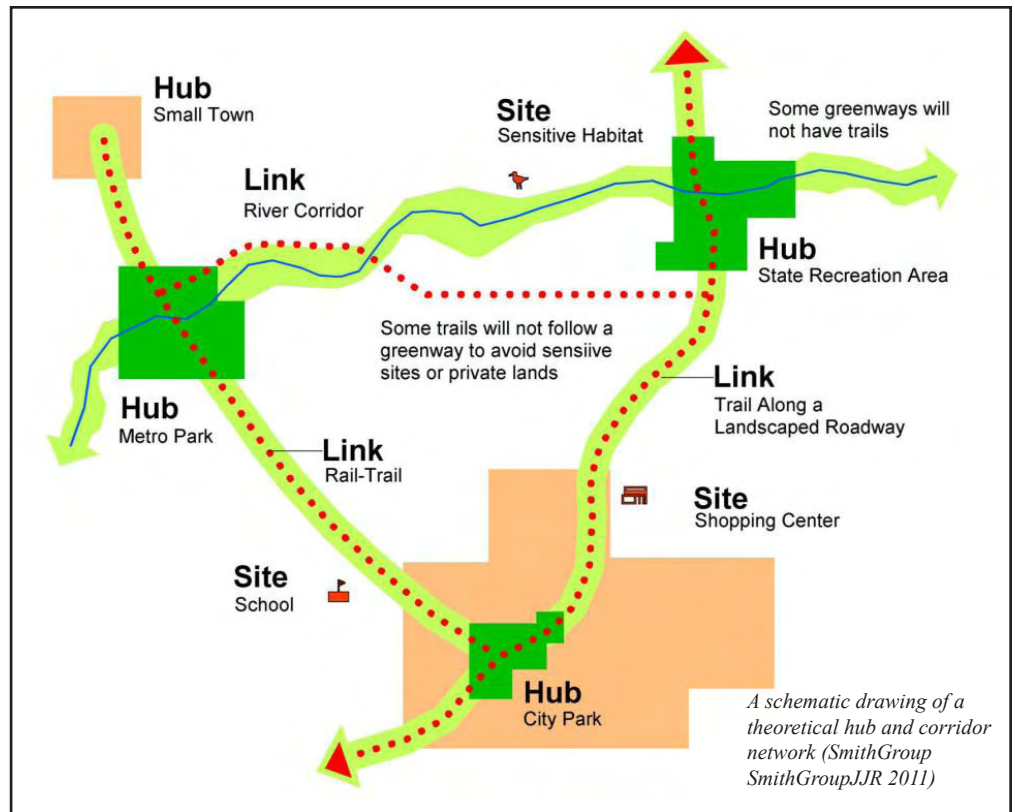
A green infrastructure plan provides communities with a roadmap for protecting, expanding, restoring and connecting ecosystem functions and values on the most important green spaces; and guiding future built spaces and gray infrastructure toward locations where ecosystem functions and values are less apparent.

Another good definition of green infrastructure is described in USEPA's Water Quality Scorecard:

Large-scale green infrastructure may include habitat corridors and water resource protection. At the community and neighborhood scale, green infrastructure incorporates planning and design approaches such as compact, mixed-use development, parking reductions strategies, and urban forestry that reduces impervious surfaces and creates walkable, attractive communities.

At the site scale, green infrastructure mimics natural systems by absorbing stormwater back into the ground (infiltration), and using trees and other natural vegetation to convert it to water vapor (evapotranspiration) . . . in a way that maintains or restores the site's natural hydrology.

While green infrastructure plans are expressed at different scales and executed using a variety of strategies, most plans include an identification of important “hubs” connected by important “corridors.” Hubs are usually defined as large, intact blocks of land that significantly contribute to critical ecological functions such as habitat for native plants and animals, water quality, flood protection, and other functions. Corridors are the linkages and vectors between the hubs that contribute to the long term sustainability and diversity of the hubs.



Chicago Wilderness and CMAP collaboration

The Chicago Wilderness Green Infrastructure Vision (*see next pages*) was officially recognized in the Chicago Metropolitan Agency for Planning’s (CMAP) GO TO 2040 (2010) as part of its recommendations to expand and improve parks and open space. CMAP and Chicago Wilderness joined together to develop the next generation data product and decision support system to allow users to make informed on-the-ground decisions to help them:

- Positively influence economic development goals;
- Expand overall quality of life in the region;
- Support goals of the GO TO 2040 plan, the Illinois Wildlife Action Plan, and the Chicago Wilderness Biodiversity Recovery Plan.

- Connect habitat areas and create new ones through restoration projects;
- Identify areas to target conservation investment funds;
- Target green infrastructure in local land-use plans and zoning ordinances;
- Positively influence gray infrastructure investment;
- Expand greenways and trail systems;
- Connect residential and commercial uses with green spaces;



Background: Mapping the CW Green Infrastructure Vision (GIV)

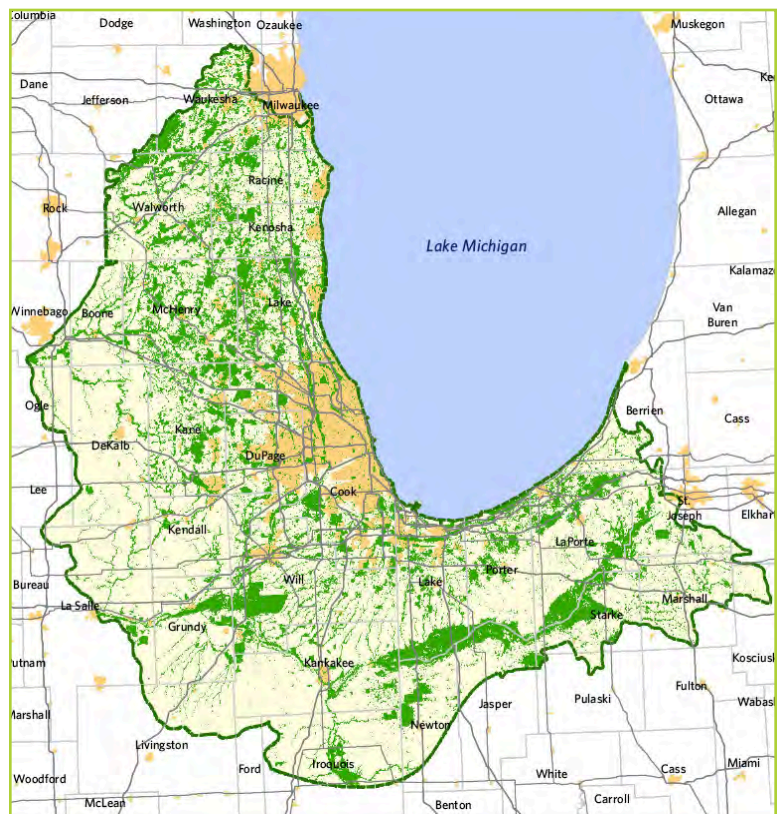


In 2004, members of Chicago Wilderness came together to begin the framework for a Green Infrastructure Vision (GIV). The GIV map produced from that effort identified 1.8 million acres for prospective protection, restoration, and thoughtful land development practices in the Chicago Wilderness region — spanning from southeast Wisconsin, through northeast Illinois into northwest Indiana and southwest Michigan. The Vision calls for us to carefully think about how we can live in and among natural areas in a sustainable way and to mutual benefit, by using tools such as conservation development, conservation easements, and thoughtful land use planning. The 140 Resource Protection Areas mapped by the GIV served as opportunities to focus land acquisition, expand restoration on private land, and promote greenway connections, conservation easements, conservation design practices, agricultural preservation, protection of sensitive groundwater recharge areas, implementation of wastewater reclamation alternatives, and protection of stream and wetland buffers.



In 2009, Chicago Wilderness members began a coordinated effort to refine the original GIV map and to begin to implement the Vision at four scales:

- **REGIONAL** - by working with regional planning agencies to redefine how we think about sustainability and community health by incorporating conservation development principles and natural resource preservation into land use and transportation plans.
- **COMMUNITY** - by incorporating principles of biodiversity conservation, sustainability, and people-friendly design into land-use plans and ordinances.
- **NEIGHBORHOOD** - by promoting the preservation of natural spaces, conservation design and access to nature into developing communities
- **SITE** - by promoting native landscaping, the use of rain gardens and rain barrels, and through the greening of schoolyards and other community open spaces.



INTERCONNECTED

IMPLEMENTING THE GIV

The green areas mapped in the 2004 and the new refined 2012 GIV map identify land which lends itself to a multitude of strategies to help achieve sustainable healthy systems for our future generations into the next century. Some of these are:



Natural areas protection

- by acquisition
- thru easements
- developing macrosites
- buffering streams & river corridors



Restoration

- on public & private lands
- species reintroduction
- burn management
- invasives removal



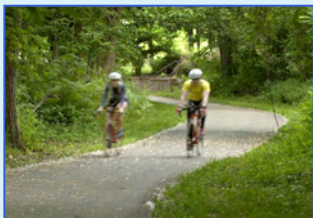
Resource sensitive development practices

- conservation design & low impact development
- coordinated local & multi-jurisdictional planning
- openspace & greenways



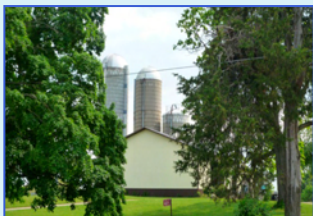
Water resource protection

- stormwater treatment trains, swales/naturalized detention
- raingardens & infiltration
- protection of sensitive recharge areas
- wastewater reclamation



Quality of life

- openspace for recreation
- land and water trails
- access to wildlife and nature



Farmland preservation

- preservation of rich prairie soils
- ensure access to locally grown food

Sustainable Watershed Action Team

SWAT - the Sustainable Watershed Action Team - was created in 2004 in response to an extensive municipal need assessment conducted by a Chicago Wilderness (CW) taskforce in conjunction with NIPC (Now CMAP). While land-use decisions are made at the local level, many municipalities and local units of government acknowledge their lack of technical capacity to strengthen their planning infrastructure (plans and ordinances) and to promote sustainable development and protection of natural resources. SWAT was developed to deliver customized, cost-effective direct technical assistance in developing local plans, adopting protective ordinances, and assisting with other sustainability projects. Current and past SWAT projects include work with Lake, Boone, Winnebago, DeKalb, McHenry, and Kane counties, Elgin, Aurora, Campton Hills and others, and with organizations such as Openlands, CMAP and Metropolitan Planning Council.

SWAT's unique local government technical assistance program works with specific tenets:

- a. Government units are willing, engaged, and interested working with SWAT on a mutually identified project and actively assist in the project, increasing the likelihood of success.
- b. Each project is customized to meet the needs of the "client," with SWAT utilizing existing material from previous efforts wherever possible.
- c. Selection of SWAT-funded private consultants targets the specific skills needed to address the problem or issue of the "client". Consultants must demonstrate a history of ecological and economic success in implementing the targeted work.
- d. Each project has a built-in funding mechanism to provide match for the primary funding source. The local unit of government provides, at a minimum, in-kind services, and the SWAT consultants work at a partially pro-bono rate that is one-half to one-third their normal billing rate, enabling SWAT to provide high-quality expert assistance at a fraction of the actual costs.
- e. Currently, SWAT projects are funded by grants from private foundations.

SWAT's current focus is implementation of green infrastructure (GI) mapping and policies and is engaged in numerous GI projects including McHenry and Kane County-wide mapping and with numerous CW area communities.

Bannockburn, IL



About the Collaborating Communities

Three-Community Green Infrastructure Planning - Lake County, IL

Bannockburn is a village in Lake County, Illinois. The population was listed at 1,586 at the 2010 census. Part of the Chicago area's affluent North Shore region, Bannockburn has very high real-estate values; the average value for a home in Bannockburn in 2010 was over \$991,000.

Bannockburn was founded by Scottish real estate developer William Aitken, who planned a community of "country estates" on 110 acres in inland Lake County. Named for the Scottish village of Bannockburn, the Village began construction in 1924 and was incorporated as a village in 1929.

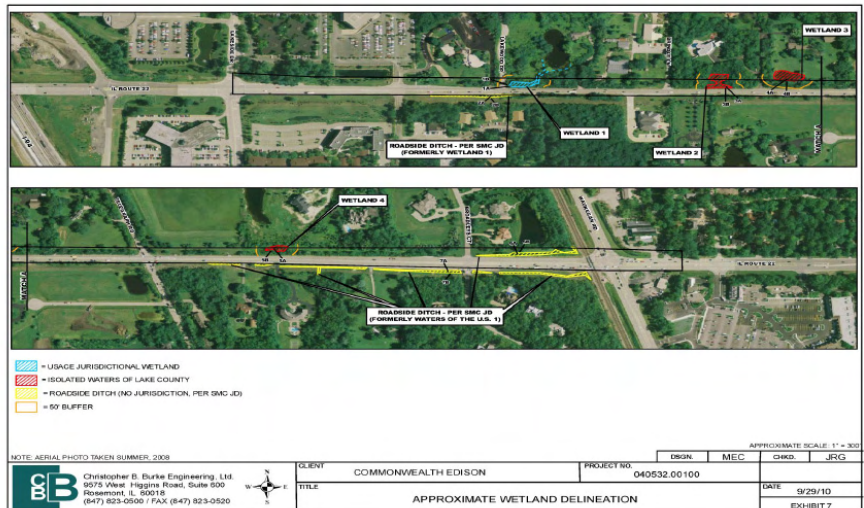
Gradually, Bannockburn expanded its boundaries to its current 1,318 acres. In the late 1960s Bannockburn approved the construction of the first of several business parks along the Village's northern edge. It created its first commercial zone in 1984 along Illinois Route 22. Bannockburn's municipal services expanded slowly in an effort to limit taxes, but it established a police department in the 1970s and built a village hall in 1992.

According to the United States Census Bureau, the village has a total area of 2.0 square miles. The Tri-State Tollway forms the Village's western boundary, with the Village of Lincolnshire present on the other side of the highway; the city of Lake Forest borders the Village to the north, the Village of Deerfield lies to the south. While much has changed since the founding of the Village, Bannockburn has remained true to the original vision of Mr. Aitken and his first master plan. Today, Bannockburn remains a refreshing island of "country estates" within the greater Chicago metropolitan area. Bannockburn has been able to maintain its identity and character only through a tenacious adherence to sound land-planning principles and its dedication to the preservation of its woodlands.

Although nestled between major transportation arteries, Bannockburn supplies a rural atmosphere

of natural landscapes and open space that provides a much needed contrast to the surrounding metropolitan area. The concept of green practices is not alien to Bannockburn. Around 2008 the village initiated a Rain Garden Participation Program in an effort to manage stormwater. The Village provides matching funds for residents for up to \$2500. Additionally, the Village has installed several rain gardens throughout the community on public property. More recently the Village partnered with the Illinois Department of Transportation and landowners in an innovative collaboration to provide green infrastructure practices on the Route 22 road improvements.

Incorporation of Best Management Practices Ideal in the Depressed Areas and Wetland Areas Along Route 22



RAIN GARDENS

VILLAGE OF BANNOCKBURN

What is a Rain Garden?
A Rain Garden is an attractive, environmentally friendly way for individual homeowners to manage and reduce water runoff and improve water quality.

Rain Gardens...
Absorb and filter water, typically from a roof downspout or sump pump. Are planted with native wetland and prairie wildflowers and grasses, which are hardy, low maintenance and aesthetically pleasing. Provide food and shelter for a variety of birds, butterflies, and dragonflies (which eat mosquitoes).

Rain Garden Basics
• Construct at least 10 feet from your house, between the downspout and a naturally low spot in your yard.
• Excavate soil and replace with stone and a sand/soil mix to promote infiltration.
• Plant in the spring before June 15; however, the excavation work may be completed at any time of the year.
• Typically, a residential rain garden ranges from 100 to 300 square feet.
• Don't worry about mosquitoes, properly sited and constructed rain gardens won't hold water long enough for them to reproduce.

FOR MORE INFORMATION CONTACT:
GHA GEWALT HAMILTON ASSOCIATES, INC.
www.gwha.com

Mettawa, IL



About the Collaborating Communities

Three-Community Green infrastructure Planning - Lake County, IL

Mettawa is a village in Lake County, Illinois, encompassing 5.39 square miles. The Village has a long history of preserving open lands and low-density residential development, with a 2010 population of 547. The Village maintains trails for pedestrian, bicycle and equestrian usage. Five forest preserves managed by the Lake County Forest Preserve District are located within Village boundaries including: Old School Forest Preserve, Grainger Woods Conservation Preserve, MacArthur Woods, Captain Daniel Wright Woods and the former home (and grounds) of Adlai E. Stevenson II.

Named for a Chief of a nearby Potawatomi settlement which is mentioned in an early history of Lake County, Mettawa was founded by area residents in 1960 who worked together with a common goal of protecting their rural area from encroaching commercial development. Mettawa's first mayor was James Getz; subsequent mayors included Ed Fitzsimons, Julius Abler, and Barry McLean. Famous residents and property owners within the area now known as Mettawa have included two-time presidential nominee Adlai E. Stevenson, city planner Edward H. Bennett and more recently, news anchor and rancher Bill Kurtis. Stevenson's Mettawa estate on the Des Plaines River is a designated Illinois Historic Site and is listed on the National Register of Historic Places.

On its website, Mettawa mentions that in an effort to maintain its "rural" small town roots, it has no employees or a Village Hall. Village meetings are held in a local hotel, and the Village contracts with an engineer, attorney, and various consultants for operational services.

In January 2009, the Village Board established its website which serves as a virtual Village Hall, providing official information including Village contacts, official documents and maps, meeting agendas and the Comprehensive Plan.

Mettawa has a special section on Sustainability on its website which references the necessity of planning that includes "Green Infrastructure" concepts.

Incorporating an element of green infrastructure into our comprehensive planning process for land use, and land preservation, can produce benefits related to: stormwater management and flood reduction which would have benefits to Mettawa and its residents. Put another way, green planning is good planning with a greater consideration of natural environmental elements during every phase of plan development. Green planning sees the big picture and should strive for each planning decision to contribute to more environmentally sensitive and sustainable projects.

Sustainability

Mettawa is a community that holds the land very dear.

- The Village has installed trails that connect to five forest preserves in and around Mettawa -many of these forest preserves have been donated by our own residents.
- Adlai Stevenson lived in Mettawa where he served as a founder of the Village, and later was a presidential candidate. Eventually, he became a leading Ambassador to the United Nations. His former home is now owned by the Forest Preserve and is open to the public. The home showcases artifacts/gifts from various dignitaries who visited and who would ride through the open lands of Mettawa as many needed a break from the rigors of public service.

Sustainability is a concept broadly defined. It can apply to plans, programs, and designs and should be a goal at all scales of planning. It is a concept that relates to the social, economic, natural and man-made environments.

The United Nations Bruntland Commission defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." Another term, sometimes used interchangeably with sustainability is "green." However, green programs and plans focus not on the three-pronged approach.

Green infrastructure looks to influence and support communities like Mettawa. Elements of this concept focus on integrating and preserving wetlands, surface and ground water, woods and native landscapes, streetscapes, parks and open space. Two examples where the Village is using this model include:

- Managing soil that becomes compacted during construction to avoid long-term expenses caused by damaged vegetation and increased runoff which can lead to flooding problems and water pollution.
- Using green pesticides to avoid contaminating ground, surface water, and shallow wells...and encouraging residents to apply such to their lawns and gardens to keep their land as healthy as possible.

Incorporating an element of green infrastructure into our comprehensive planning process for land use, and land preservation, can produce benefits related to: stormwater management and flood reduction. Put another way, green planning is good planning with a greater consideration of natural environmental elements during every phase of plan development. Green planning sees the big picture and should strive for each planning decision to contribute to more environmentally sensitive and sustainable projects.



Lincolnshire, IL

The screenshot displays the official website for the Village of Lincolnshire, Illinois. The page features a green and white color scheme. At the top left is the village logo, which includes a stylized tree and the text "Village of Lincolnshire Incorporated 1957". A navigation bar contains links for "Home", "About", "Government", "Departments/Services", "Community", "Business", "News/Updates", and "Contact Us". A search bar is located below the navigation bar. On the left side, there is a "Quick Links" menu with items such as "Applications, Permits, and Policies", "E-Mail Updates", "Employment", "Flood Protection Information", "Freedom of Information Act", "Interactive Map", "Meeting Agendas and Minutes", "News and Tips", "Notice of Foreclosures", and "Recent Board Actions". The main content area includes a "Village News/Information" section with several news items: "Outdoor Fires During the Drought", "Water Restrictions Now Enforced", and "Farmers Market Coming Soon!". Below the news is a "Village Calendar" section showing "Monday, August 27th - Village Board /". A "SIGN UP NOW" button for "Connect-City" notification services is also visible. The background of the website is a scenic image of a large, mature tree with green foliage.

Graphic produced from image by Susanne Masi

About the Collaborating Communities

Three-Community Green Infrastructure Planning - Lake County, IL

Lincolnshire is a village in the Vernon Township region of Lake County. The Village is a northern suburb of Chicago, a city in the adjacent Cook County. Its population was 7,275 at the time of the 2010 census. Lincolnshire was incorporated on August 5, 1957, from the unincorporated Half Day area when land was purchased to build a residential subdivision. The community underwent an aggressive era of expansion from 1983 to the 1990s. The Des Plaines River bisects the village, passing from north to south; Illinois Route 22 also divides the village into two parts, crossing the village from east to west.

Lincolnshire is home to the public secondary Adlai E. Stevenson High School institution and the schools that compose the elementary Lincolnshire-Prairie View School District 103. It serves as the headquarters for corporations including the global outsourcing company Aon Hewitt, and is the base of operations for the Newman-Haas Racing team. The Village of Lincolnshire hosts several annual festivals (including one mirroring the Taste of Chicago) in either commercial establishments such as City Park or the Village Green, or in one of its nine public parks.

The Lincolnshire area was originally a part of the town of Half Day, the first region settled by non-Native American peoples in Lake County. The first European settler in the Lincolnshire area was Captain Daniel Wright, who arrived in 1834. Chief Halfda allowed Wright to build his cabin at the south end of the Potawatomi village at the site of the intersection of present-day Milwaukee Avenue and Aptakisic Road. The Potawatomi tribesmen were ousted a year later in the 1833 Treaty of Chicago, which was implemented two years after its ratification, and faced relocation.

The Village has worked hard to maintain its semi-rural character during the last housing boom and boasts several parks that have incorporated green design and stormwater management strategies. The Florsheim Nature Preserve was donated to the Village of Lincolnshire by the Florsheim family. Around 1998 restoration work was begun on the site with the help of Illinois Department of Natural Resources (IDNR) OSLAD

funding. The site was dedicated an Illinois Nature Preserve because of its high quality and the presence of endangered plant species. When a development for homes was proposed adjacent to the site on 67 acres, the Village required a conservation design which reduced the number of homes to 27, and introduced bioswales, stormwater treatment trains, and conservancy buffers to protect the preserve. Around 1999, the Village purchased an additional 65 acres adjacent to Florsheim to add land to the preserve. This addition was restored with IEPA and IDNR funding.

With this final purchase, the Village added 25 acres for recreational use in North Park. The site was developed using green infrastructure practices like open bioswales in the parking areas, a naturalized detention pond, a buffer zone along the river, and the ball fields are made utilizing special clay soils to reduce the amount of water needed for watering and to reduce run-off from the site.



How the GI Planning Process Works

When developing green infrastructure (GI) maps and plans, it is important that Chicago Wilderness' SWAT utilize a similar methodology in order that a common definition of GI is employed and the end-result is consistent across the CW region, although local variations are anticipated and encouraged. Below is a description of the process developed through experience over multiple projects.

When beginning the GI process, the first step is to identify the support and expertise that will be required to complete an accurate GI map and to have the political and public support to adopt a GI plan. These groups can be roughly described as:

1. *Decision-makers/Policy-makers*

It is important to have the support of key decision-makers and policy-makers at whatever level of government the GI plan is being developed. This could include county board or city council members, village or city administrators, or key environmental committee members. The GI planning process is often initiated by this group, or at the very least, with their support.

2. *Natural Resource/GIS Experts*

There are two critical areas of expertise needed to develop a comprehensive GI map, the first step in the GI planning process.

- Engagement of a broad range of people who have knowledge of the natural resources in the planning area. This can include planning staff, forest preserve or conservation district staff, or representatives of local conservation organizations.

- The second area of expertise that is pivotal to a quality final GI map product is access to Geographic Information System (GIS) expertise and the commitment of a highly skilled GIS technician.

3. *General Public*

Involvement of the general public is an optional component of the GI planning process. In some cases, local governments have held public meetings to inform the public about GI and the planning process and to ask for their input. In other cases, the GI map has been integrated into the comprehensive planning process so public involvement has occurred at that level and not at the GI planning phase.

GI Mapping Process:

The first step in the GI planning process is to develop a comprehensive inventory of GI resources from across the planning area. This requires the involvement of GIS and natural resources experts. Specific steps include:

- Scheduling a meeting of key stakeholders to share information about GI so everyone has a common understanding of the GI goals and process.
- Identifying the data layers to be used in the GIS mapping process.

Core Green Infrastructure serves as the backbone of the GI network. It is the inter-connected network, or large clusters, including ecologically important areas and already protected and/or regulated areas. Data that can be included in the Core GI:

- Water (lakes, ponds, rivers, creeks)
- Wetlands (NRCS, ADID) – Include all ADID HQ Habitat wetlands,
- Illinois Natural Area Inventory Sites
- IDNR lands: Nature Preserve & Land and Water Reserve Preserve sites and trails
- Forest Preserve and Park District lands
- Buffers -- To be added to key natural resource layers above. Chicago Wilderness precedent, start with a consistent buffer of 200 feet.
- FEMA 100-year flood hazard areas
- Hydrologic Atlas, if available
- Threatened and Endangered Species locations
- Class III Groundwatershed areas, if applicable
- Special local resources, e.g., Bannockburn's rain gardens)



Meeting of resource experts - McHenry County GI mapping

Supporting Green Infrastructure is to be considered in addition to the core GI network on a case-by-case basis based on proximity, potential linkages, size, and professional judgment:

- Hydric Soils
- Organic Soils (includes peat and muck areas)
- Sensitive Aquifer Recharge Areas (SARA)
- Highly Erodible Soils
- Other Supporting GI to be considered, as appropriate:
 - Chicago Wilderness Green Infrastructure Vision 2.0 mapping data sets (available on CMAP web site)
 - Key Conservation Opportunity Areas (COA),
 - Natural resource and open space mapping from adjacent communities (to identify possible cross-jurisdictional connections)
 - Relevant mapping from adopted watershed plans

Once these areas have been mapped by the GIS expert, natural resources experts from across the planning area can be invited to examine the map to identify missing information or to determine where gaps need to be connected. This process can begin by identifying specific goals for each watershed or sub-watershed in the planning area based in the characteristics and unique qualities.

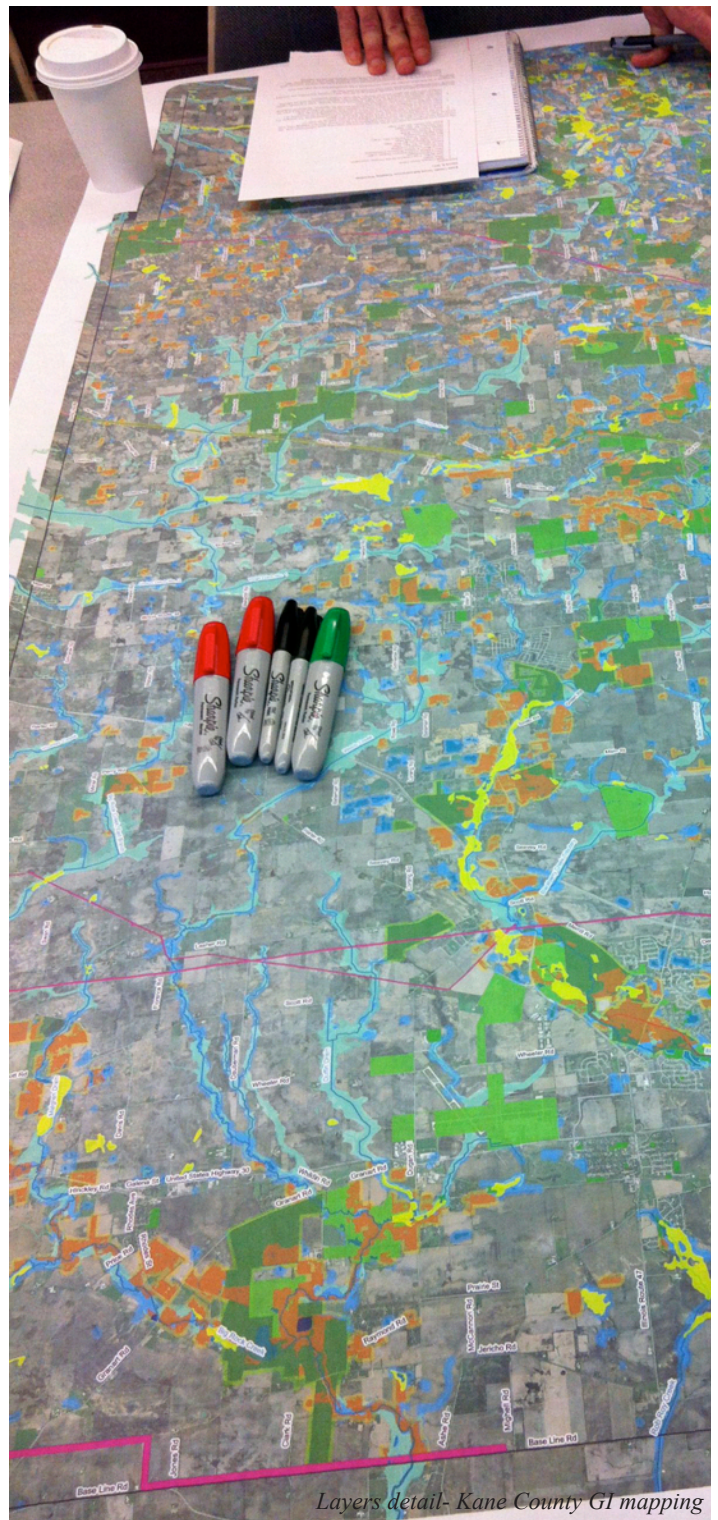
Examples include:

- Preserve Water quality
- Maintain integrity of stream corridors
- Preserve stream buffers, special attention to high quality ADID wetlands, organic basins and connecting oak woodlands
- Identify opportunities to naturalize channelized segments
- Enhance connectivity and integrity of remnant oak woods
- Provide community linkages

A completed GI map and process provides for additional community opportunities such as:

1. Once the GI map is complete, planning and natural resource staff can begin to identify implementation recommendations. These recommendations can be made in a separate GI Plan or integrated into a local government's comprehensive plan. Where the GI map and plan become a part of a larger planning process, it is important that GI be integrated across all other components of the plan, such as transportation and economic development to ensure that green infrastructure will be protected as the larger plan is implemented.

2. An additional important step is to examine the local government's ordinances to ensure that the GI recommendations can be legally implemented across the planning area. For example, the GI plan may have recommended that rain gardens be utilized as a component of stormwater management, so the stormwater management ordinance needs to allow practices compatible with this goal.



The Lincolnshire, Bannockburn, Mettawa GI Planning Process

The first meeting was held on March 8, 2011 with representatives from each of the three committees and SWAT being present. The desired outcomes of the GI planning process were discussed in order to reach agreement on the first steps. These outcomes included:

- Improved water quality
- Reduced flooding
- Improved habitat for wildlife
- Reduced soil erosion
- Encourage native plantings and reduce weedy invasive species
- Protect remnant natural areas
- Attract and leverage grants
- Connect parks and trails
- Buffer sensitive resources
- Plan for emerald ash borer
- Improve quality of life
- Partner with regional open space objectives
- Provide a regional model for green infrastructure
- Reduce cost of gray infrastructure
- Encourage alternative stormwater management
- Link ordinances with green infrastructure objectives

Key representatives met from mid-March through July 2011 to identify the core data layers to include in the GI map. These open spaces resources would serve as the backbone of the GI network. A draft GI map was developed and reviewed by natural resource experts from key agencies and organizations from across the county. Gaps were identified and a draft GI map was completed by September 30, 2011 as identified in the grant agreement.

SWAT consultant from SmithGroupJJR reassembled the resource experts team on September 26, 2011. The DRAFT GI map as refined with the following methods and comments:

We began with the DRAFT GI map that included the following layers serving as the backbone of the GI network:

- IDNR Nature Preserves
- Public open space including: protected public lands, forest preserves, parks, nature preserves
- Private (conservation easements) open space
- Hydric soils
- Lake County ADID wetlands
- NRCS wetlands

- Water (lakes, ponds, rivers, streams)
- Stormwater retention, detention and natural conveyance systems
- Trails and greenways
- FEMA flood hazard areas
- 100 year floodplain
- Known occurrences of rare or sensitive species
- Watersheds and subwatersheds
- Natural Area Inventory Sites
- SSURGO Potential Native Vegetation (NRCS)
- Remnant habitat
- Open space with high restoration potential

We combined public open space into one layer and added a 200' buffer around its perimeter.

We combined privately protected open space (conservation easements) and added a 200' buffer around its perimeter.

We combined Lake County ADID and NRCS wetlands into one layer and added a 200' buffer around its perimeter.

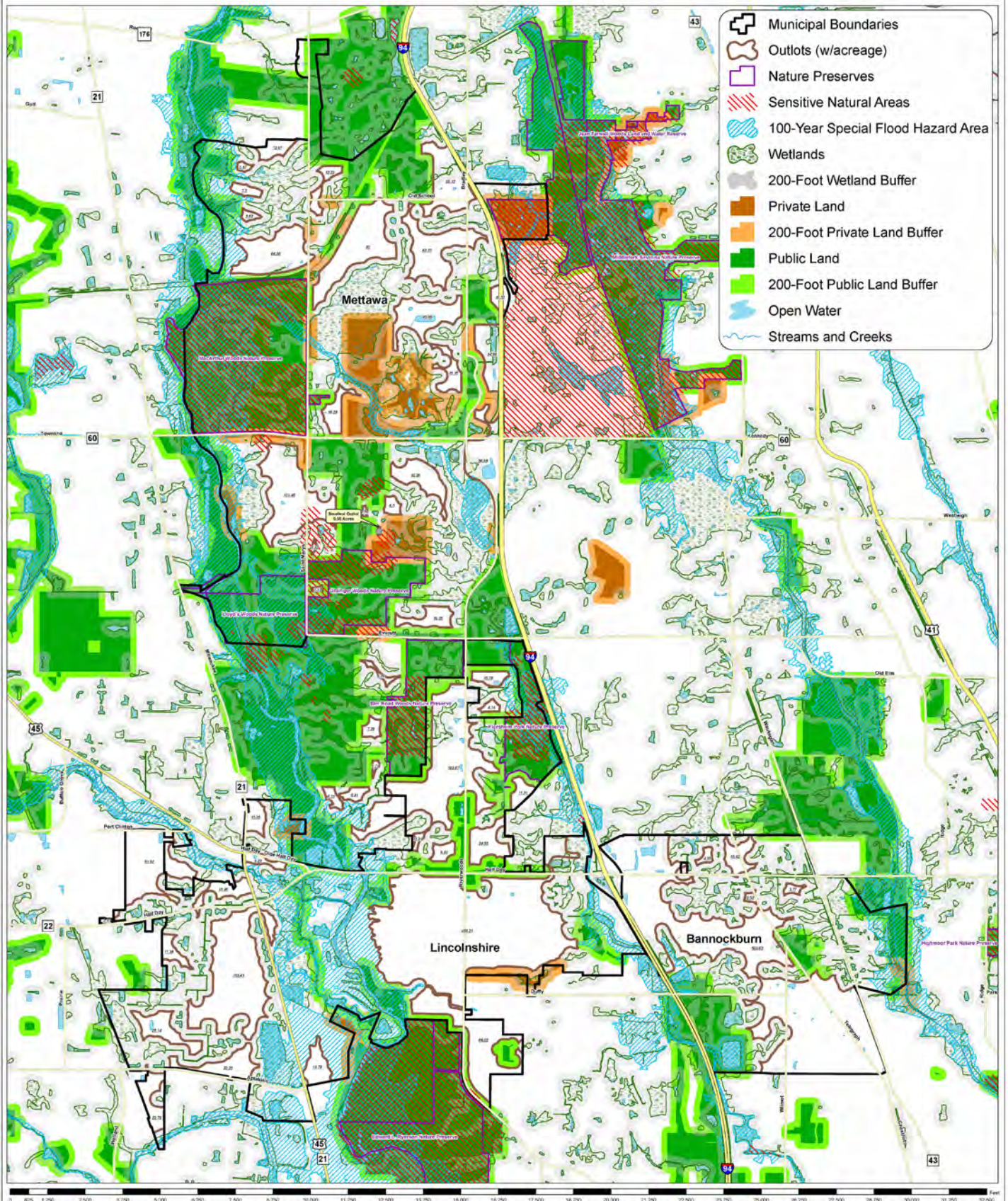
DRAFT GI map was red-lined as follows with the following agreed upon parameters:

- Isolated wetlands not connected to core GI areas were deleted;
- Isolated "outlots" within the core GI network were included (The GIS expert will calculate the area for us).
- Headwater drainage ways were protected even if they appeared to have limited ecological benefits beyond water quality protection.
- Subdivisions that met the criteria above and were developed using BMPs and easements were included.
- Floodplain area that did not meet other criteria was included.
- Areas that met mapped criteria but were clearly developed were excluded.

Additional OBSERVATIONS and COMMENTS from reviewers regarding the GI map:

1. The core layers of protected public and private open space, wetlands, and the 100 year floodplain create a very obvious interconnected network, especially after you add the 200' buffer.

Lincolnshire, Bannockburn, Mettawa GI Map



- Municipal Boundaries
- Outlots (w/acreage)
- Nature Preserves
- Sensitive Natural Areas
- 100-Year Special Flood Hazard Area
- Wetlands
- 200-Foot Wetland Buffer
- Private Land
- 200-Foot Private Land Buffer
- Public Land
- 200-Foot Public Land Buffer
- Open Water
- Streams and Creeks

Core Corridors with a 200-Foot Buffer



STORMWATER MANAGEMENT COMMISSION
 This map is provided for general informational purposes only. Map features have been derived from all available sources, each of which has its own scale and accuracy. The locations of all features are approximate.
 Lake County Stormwater Management Commission
 October 7, 2011

DATA SOURCES:
 Village of Mettawa
 Village of Lake Bluff
 Village of Lincolnshire
 Lake Bluff Open Lands
 Lake Forest Open Lands
 Lake County Forest Preserve
 Lake County Stormwater Management
 Illinois Department of Natural Resources
 Lake County Department of Information and Technology, GIS & Mapping Division

2. Other water (lakes, ponds, ditches) with buffers creates a discernible, interconnected pattern, but in many cases, these patterns are long and linear rather than in blocks, and are connected to the larger core blocks only at the ends.
3. Long, linear zones of water likely provide different values than the larger core blocks of habitat. For example, linear water zones are prevalent within the west side of Lincolnshire. These are primarily detention ponds and drainage ditches with minimal direct habitat value. However, these waterways are also the first resource to capture urban runoff high in salts before discharging into the Des Plaines.
4. We did not include secondary or supporting layers such as hydric (especially muck) soils, highly erodible soils, areas with a high restoration potential, because our core areas with buffers formed such a large, discrete block.
5. We need to cross reference the GI map with Threatened and Endangered species locations.
6. Future iterations may compare the location of existing oak woodlands with remnant oak woodlands from the 1939 aerials and use the overlap as another potential GI layer. (*NOTE: This layer is now complete and available from LCFPD*)
7. The decision was made to have the map be very inclusive (smaller resource areas were included), and local community representatives present confirmed this level of mapping is appropriate for the three communities represented.

Lydia Scott, staff from the Village of Lincolnshire, presented the red-lined GI map to the three community representatives on September 27, 2011 and received their approval. She delivered the red-lined GI map to Jeff Laramy, GIS expert, Lake County Stormwater Management on September 27 for final refinement.

The SWAT consultant developed a short GI handout (*Note: Document is located is accompanying separate Appendix - I*) to share with policy leaders and governing boards of each of the three communities. This handout and the GI project was discussed with the Village of Lincolnshire board on November 14, 2011 and the Village of Bannockburn board on December 12, 2011.

Once a GI map is complete, it can be an important next step to review each community's ordinances to determine if additional policies can be adopted to provide greater resource protection and implementation of green infrastructure at the community, neighborhood, and site levels. In a testament to Lincolnshire, Bannockburn and Mettawa's commitment to maintaining and enhancing their existing natural resources, all communities agreed to participate in an ordinance review. Over course of Winter 2013 the villages made their relevant ordinances available for SmithGroupJJR Consultants to review. The recommendations for each community were collated into a single document and are included with this document in the appendix.

***Lake County Stormwater Management Commission is maintaining the GIS layers and has posted a very high resolution (60MB) version of the final map at:
<ftp://ftp.lakecountyil.gov/smc/SWAT-GI/>***



Implementation Recommendations

This section identifies recommended policies, strategies, and actions to achieve the green infrastructure purposes identified in the Green Infrastructure background chapter. (*Consult the accompanying Appendix document for resources and funding sources for implementation of green infrastructure.*)

COORDINATE IMPLEMENTATION

Coordinated planning and implementation are critical because green infrastructure resources do not observe political boundaries. Some examples of coordinated planning actions and opportunities are:

- Protection of sensitive stream or wetlands and river resources is 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.
- Similarly, protection of groundwater aquifers requires the coordinated efforts of the county and local governments to identify and plan for the protection of critical recharge areas. And it also requires responsible actions of roadway maintenance agencies, as well as businesses and residents, to control the use of road salts and other potentially damaging chemicals.
- Lake County has a remarkable regional open space and trail system owned and managed by LCFPD.
- 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.

PROTECT CORE GREEN INFRASTRUCTURE

As noted previously, there is an array of techniques that can be used to protect green infrastructure. 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. Recommendations 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 landscape
- 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 Lake County Forest Preserve District and other open space agencies in protecting over land in the county.

Implementation Recommendations

Lake County Forest Preserve District, the Village park districts and park departments, and townships should continue to acquire natural open space with a priority placed on areas identified in the green infrastructure network map. Cumulatively, these agencies should strive for a county wide goal of 20 % open space as recommended in the *Lake County Land Vision Plan*. This plan was developed by the Land Conservation Partners of Lake County is comprised of 17 governmental, private and non-profit organizations dedicated to preserving open space. To achieved this the following actions are recommended:

- Park districts, park departments, and township open space districts should identify green infrastructure priorities in their master plans. In particular, they should identify and implement opportunities for protecting local natural 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 macrosites of natural communities for protection of plants and animals that require large tracts of land to survive. In particular, connectivity of wetlands, stream corridors, prairies, savannas, and woodlands should be targeted.
- LCFPD, park districts and departments, the county and other local agencies should coordinate their efforts to promote ecotourism resources, such as parks, natural resources, and similar points-of interest.

Implementation Recommendations

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. Conserve Lake County (CLC) works with landowners so they understand the options they have to preserve their land. They facilitate land preservation arrangements between landowners and other land conservation organizations such as the Lake County Forest Preserve District, the Illinois Nature Preserves Commission and other conservation land trusts. Their work in the Liberty Prairie Reserve is a model for preserving land through public-private partnerships. CLC is a lead partner in the Lake County Land Vision for Lake County's open space future with a goal to preserve 20% of the county by 2030. Since 2004 they have preserved over 400 acres of land, through land donations, easements, landowner negotiations, and land purchases.

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.

Implementation Recommendations

- Conserve Lake County, Mettawa Open Lands Association, 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.

TARGETED LAND USE PLANNING AND ZONING

The goals of many of the three Villages' various plans specifically focus on protection of natural resources and the environment, preserving environmentally sensitive areas, providing aesthetically pleasing places, and preserving and enhancing existing surface and groundwater resources. And they identify many of the key elements of green infrastructure planning including: open space, trails, wetlands, river and streams protection as well as environmentally sensitive natural resources.

One of the primary ways to implement land use policy is through zoning and other ordinances. Once a GI map is complete, it can be an important next step to review each community's ordinances to determine if additional policies can be adopted to provide greater resource protection and implementation of green infrastructure at the community, neighborhood, and site levels. In a testament to Lincolnshire, Bannockburn and Mettawa's commitment to maintaining and enhancing their existing natural resources, all communities agreed to participate in an ordinance review. Over the course of winter 2012, the villages made their relevant ordinances available for SmithGroupJJR Consultants to review. *The consultant's ordinance recommendations for were collated into a single document and are included with this document to the Villages in a separately provided Appendix document.*

Implementation Recommendations

- The Villages 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 priorities to natural resource constraints and opportunities, particularly streams, rivers, wetlands, and their respective watersheds and recharge areas. 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 identifying creative design techniques such as lot clustering.

Implementation Recommendations

CONSERVATION DEVELOPMENT

Conservation development offers a valuable tool to protect sensitive areas, establish greenway and trail connections, and provide for long-term enhancement and stewardship of ecologically important lands. Conservation development 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 build through these natural areas – resulting in loss and fragmentation of natural resources – conservation design seeks out creative approaches to preserve and enhance them.

Conservation development principles can apply to both commercial and residential developments. A core tool of residential conservation design is “clustering” – 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. Preserved open spaces can be enhanced with trail systems that connect to adjacent developments and public trails and open spaces.

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.

Another critical aspect of conservation design is to incorporate elements that minimize increases in stormwater runoff and degradation of runoff quality. Low impact development (LID) designs feature narrower streets, permeable paving, and stormwater best management practices such as bioswales and rain gardens. Their goal is to maintain natural recharge of rainfall and runoff, thereby protecting groundwater aquifers and providing clean, healthy baseflows to streams and wetlands.

Implementation Recommendations

- The Villages, in cooperation with the development community and conservation organizations, should promote the expanded implementation of conservation design for both residential and nonresidential development throughout their planning area.
- Local governments should amend their zoning, subdivision, and landscaping ordinances to allow or encourage cluster development and other conservation design techniques by right without

requiring a planned unit development.

- Conservation development should be targeted to all development parcels that include areas mapped in the green infrastructure network.
- Conservation design ordinances should build upon the successful ordinances adopted by their villages and by incorporating provisions for: A minimum percentage of open space (requirement ranges from 40 to 70 percent, depending on the underlying zoning). 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 of 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.
- Conservation developments should incorporate provisions to restore native vegetation in buffers adjacent to water bodies and wetlands to filter out damaging pollutants, preserve aquatic habitat, and protect stream banks from erosion.
- The county and local governments should encourage the dedication of open space within conservation developments 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.
- The municipalities should investigate and promote additional flexibility in their conservation design ordinance to allow for mixed densities and uses within new subdivisions such as through neotraditional development, transit-oriented development, and traditional neighborhood development.

GREENWAY CONNECTIONS

The Green Infrastructure map shows linkages that provide connectivity between adjacent natural areas, provide buffers for linear features such as streams, and sometimes serve as corridors for recreational trails. Once greenway opportunities are identified, their protection can be achieved by a variety of mechanisms including public acquisition, conservation easements, developer donations, natural landscaping, and ecological stewardship.

Implementation Recommendations

Implementation Recommendations

- The county, local governments, park districts, Lake County Forest Preserve District (LCFPD) Conserve Lake County, and other open space organizations should collaborate to link local parks and open spaces to existing and planned portions of the countywide green infrastructure and open space networks.
- LCFPD and local park districts and departments should be leaders in establishing new public greenways, particularly along the Des Plaines River and its tributaries.
- LCFPD, 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.
- LCFPD, land conservancies, relevant state and federal agencies, and watershed groups should provide technical and policy assistance to local governments and land owners to identify and implement opportunities for landscape restoration.
- Local governments should identify and utilize a suite of creative greenway preservation tools such as linkages identified in land use plans, intergovernmental agreements, and community buffers.
- Local governments should encourage the interconnection of open space and greenways during the 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 neighboring communities to make greenway connections across jurisdictional boundaries.
- Local governments and Conserve Lake County 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 river and stream corridors.
- Greenway planning and preservation entities should promote public awareness and provide technical assistance regarding greenway protection to private landowners and homeowners associations

TRAILS - BIKEWAYS AND WATER

Trails are widely supported in Lake County as a means of promoting community walkability, providing recreation, linking communities and open spaces, and connecting people to schools, jobs, and commercial centers. Much like greenways, successful trail planning and implementation requires extensive coordination between local governments, open space agencies, transportation agencies, and private landowners and developers.

Implementation Recommendations

- The Villages, Lake County Division of Transportation (LDOT), LCFPD, Chicago Metropolitan Agency for Planning (CMAP), and Openlands should coordinate their efforts to plan and implement trail corridors and circuits through-out the county to provide clear, safe connections between communities and existing and future open space areas.
- The local governments should promote the interconnection of trails between adjacent subdivisions and with local and regional trails during the subdivision approval process.
- Municipalities should encourage and plan for improved walkability throughout their communities.
- Trail planners and implementers should identify alternative sources to overcome funding constraints to the coordinated expansion of the regional trails system. Where appropriate, trail planners should seek waivers on federal projects to construct trails more affordably.
- In the identification of priority trail corridors, planners should identify multiple-use riparian (i.e., streamside) greenway opportunities to accommodate trails, wildlife corridors, and vegetative buffers.
- Local governments, park departments, and LCFPD should utilize the Northeastern Illinois Regional Water Trails Plan (as excerpted in this document) as a guide in the development of a network of stream and river canoe access facilities.
- Coordinated efforts should be undertaken to eliminate constraints to expanded water trail access, such as to portions of the Des Plaines River that are obstructed by debris and logjams. Where appropriate, multi-objective approaches that benefit aquatic habitat, flood relief, and paddling access should be pursued.

Resources - *The Northeastern Illinois Regional Greenways and Trails Plan was developed by Chicago Metropolitan Agency for Planning (CMAP). CMAP provides assistance to local governments on planning and implementing local greenways and trails.*

Implementation Recommendations

SITE-BASED GREEN INFRASTRUCTURE

Another important green infrastructure consideration is the opportunity to work with residents, landowners, and businesses – at a very local scale – to incorporate green infrastructure practices in yards, subdivisions, businesses, and school grounds. Such practices can provide water quality, flood reduction, groundwater recharge, and local habitat benefits. These green infrastructure designs also can be applied by developers at a neighborhood scale, as described previously under the topic of conservation development, or low impact development (LID).

Recommended local green infrastructure best management practices (BMPs) include:

1. *permeable paving instead of conventional asphalt or concrete*
2. *green roofs*
3. *rain barrels*
4. *bioswales and rain gardens in lieu of costly storm sewers*
5. *natural landscaping instead of conventional turf grass*
6. *naturalized detention basins designed to resemble wetlands and natural lakes*

Permeable paving:

Permeable paver systems, or porous concrete or asphalt, are paving systems with spaces that allow water to move through the driving surface rather than running off. Runoff is temporarily stored in the underlying stone base for infiltration into the soil and/or slow release to the storm drain system. Common applications for permeable paving include parking lots and driveways.

Green roofs:

Green roofs are vegetated roof systems designed to retain and slow rainwater runoff from the tops of buildings. Green roofs are commonly planted with drought and wind tolerant vegetation.

Rain barrels:

A rain barrel collects and stores rainwater from a roof that would otherwise be lost to runoff and diverted to storm drains and streams. Usually a rain barrel is composed of a 55 gallon drum that sits conveniently under a residential gutter down spout. Like cisterns, water stored in rain barrels can be used to irrigate lawns, gardens, and potted plants.

Bioswales and rain gardens:

Bioswales and rain gardens are vegetated swale

systems that have an infiltration trench designed to retain and store stormwater. Bioswales and rain gardens are planted with native grasses and wildflowers that enhance filtration, cooling, and cleansing of water.

Natural landscaping:

This refers to the use of native prairie and wetland grasses, flowers, and shrubs instead of conventional turf grass. Typical applications range from large corporate, residential, or institutional open space areas to small residential gardening projects. Native landscaping is often a component of other BMPs, such as detention basins, filter strips, bioswales, and rain gardens.

Naturalized detention basins:

Naturalized basins utilize native wetland and prairie vegetation in basin bottoms, shorelines, and side slopes. They improve water quality, discourage nuisance Canada goose populations, and provide habitat benefits. Naturalizing also may be done as a retrofit to improve water quality functions, reduce shoreline erosion, and lower maintenance costs of existing basins.

Resources

Lake County Stormwater Management Commission staff is the source for Lake County communities for advanced stormwater treatment techniques.

Implementation Recommendations

- Local governments, through ordinances and programs, should promote the infiltration of clean runoff in developed areas utilizing techniques such as bioswales, filter strips, permeable paving, and natural landscaping.
- The municipalities should amend their zoning, subdivision, and landscaping ordinances to allow or encourage green infrastructure BMPs for new development and redevelopment.
- Where appropriate, develop a comprehensive groundwater protection ordinance, which may include zoning and subdivision provisions, for recharge area and wellhead protection.
- Where not already in place, municipalities should identify and implement measures that will provide financial incentives for green infrastructure BMPs. For example, providing credit for stormwater storage under permeable paving can reduce detention requirements and storm sewer sizing, thereby lowering development costs.



GREENING *Infrastructure*
An Initiative of ChicagoWilderness