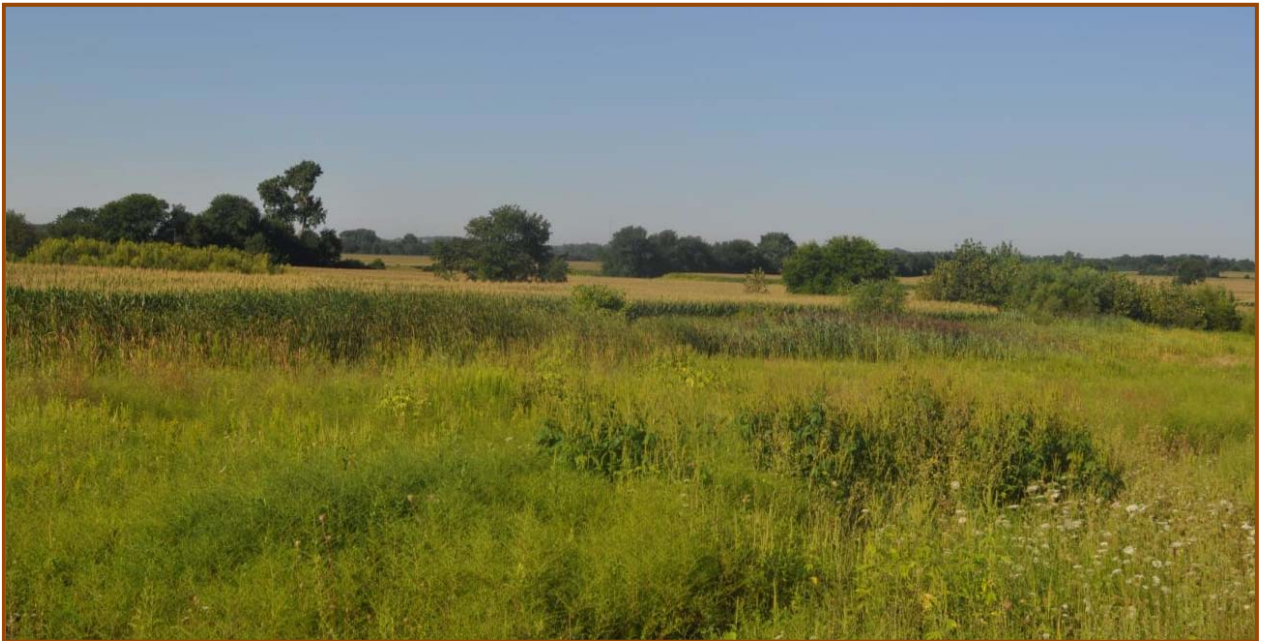


Kane County 2040 Green Infrastructure Plan



Adopted by the Kane County Board December 10, 2013



Kane County 2040 Green Infrastructure Plan

Kane County Board

Chris Lauzen, Chairman

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Jesse Vazquez
Michael Donahue
Mark Davoust
Deborah Allan
Cristina Castro
Maggie Auger

Jennifer Laesch
Ron Ford
Thomas Smith
John Hoscheit
Barbara Wojnicki
Drew Frasz
Rebecca Gillam
Joseph Haimann

2

Project Team

Mark VanKerkhoff, Director, Kane County Development Dept.
Karen Ann Miller, AICP, Executive Planner, Kane County Development Dept.
Tim Mescher, GIS Planner, Kane County Development Dept.
Ben Haberthur, Forest Preserve District of Kane County
Dennis Dreher, Geosyntec Consultants
Nancy Williamson, Illinois Dept. of Natural Resources
Brett Hanlon, Kane County Development Dept.
Ellen Johnson, Kane County Development Dept.

Financial support for this project was generously provided by the Boeing Foundation and the U.S. Forest Service through Chicago Wilderness. This project was conducted by the Chicago Wilderness Sustainable Watershed Action Team (SWAT) under the leadership of Nancy Williamson, Illinois Department of Natural Resources who provided project coordination and technical and policy guidance. SWAT consulting expert for this project was Dennis Dreher, Geosyntec Consultants.

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Mike Ander
Steve Byers
Russell Farnum
Candice Jacobs
Mary Ochsenschlager
Mike Sullivan
Jodie Wollnik

Ken Anderson
Seth Crackel
Sue Harney
Rob Linke
Paul Schuch
Drew Ullberg

Matt Bardol
Jerry Culp
Jane Holley
Dan Lobbes
Jan Sorenson
Jan Ward



“Connecting the trees, parks, and other urban green infrastructure at site and neighborhood scales to the surrounding waterways and other regional green infrastructure networks may well become the next great frontier in planning and government services.”

American Planning Association

Executive Summary

The Kane County 2040 Green Infrastructure Plan includes analysis of existing natural resources in the County and recommendations for green infrastructure priorities and approaches. The accompanying Green Infrastructure Map compliments and expands upon relevant resource mapping in the Open Space and Green Infrastructure chapter of the Kane County 2040 Plan adopted by the County Board in May, 2012.

With the support of the Kane County Board and the Energy and Environment Committee, this Plan was undertaken in early 2012 by the Planning Division with the assistance of the Chicago Wilderness Sustainable Watershed Action Team (SWAT) and green infrastructure consultant Dennis Dreher of Geosyntec Consultants, who provided project coordination and technical and policy guidance.

Based on Kane County's legacy of open space and natural resource protection and guided by the Green Infrastructure Vision developed by Chicago Wilderness, the primary objectives of the Green Infrastructure Plan were to create a detailed inventory of natural resources using the latest technology and information; use that information to create a green infrastructure map; work with the County's natural resources experts to fine tune opportunities; and finally enlist the Kane County Planning Cooperative to develop goals, objectives and actions.

The ultimate goal of the Kane County 2040 Green Infrastructure Plan is to lay the groundwork for green infrastructure planning and projects at the regional, community, neighborhood and site levels addressing current issues of water resource management, biodiversity, conservation, water supply, public health, climate change and economic development.

As green infrastructure technology advances and becomes more widespread, the opportunity increases for monetary and property savings while enhancing quality of life and preserving the natural resources of Kane County.

Background


What is Green Infrastructure?

Green infrastructure is an interconnected system of natural areas and open spaces including woodlands, wetlands, trails and parks, which are protected and managed for the ecological values and functions they provide to people and wildlife. Green infrastructure supports native species; sustains air and water resources; and contributes to the health and quality of life for people and communities.

Green infrastructure is not a new concept. In the 1860s landscape architect Frederick Law Olmsted included systems of open space in the plans he created for cities and towns across the United States. These systems of open space preserved floodplains and riverbanks and protected water quality while providing recreational and scenic opportunities for residents and established connections between larger pieces of open space. A century and a half later the value of creating and protecting green infrastructure remains.


The holistic nature of green infrastructure integrates a variety of aspects of society, offering possible answers to issues of air and water quality, sustainable water supply road congestion, habitat degradation, climate change and chronic diseases such as obesity and diabetes.

Just as our society depends on gray infrastructure, such as roads, pipes, wires and other manmade structures to support transportation, water and energy systems; we depend on green infrastructure as “our natural life sustaining system” or “the ecological framework needed for environmental, social, and economic sustainability.” In addition, just as the networks of gray infrastructure are planned, built and maintained to serve our communities, planning for our green infrastructure network needs to follow a “strategic approach and framework for conservation that can advance sustainable use of land while providing an interconnected system of green spaces that benefit people, wildlife, and the economy. This approach is intended to help provide design, planning, acquisition,



“A connected system of parks and parkways is manifestly far more complete and useful than a series of isolated parks.”

John Olmsted and Frederick Law Olmsted Jr. 1903



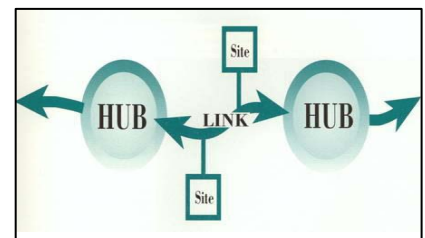
and other decision-making guidance for community-based sustainable development.”¹

Landscape architect, Ian McHarg, introduced in *Design with Nature* (1969), the concept of ecological services “that nature has a direct and measurable value to human well-being by providing benefits such as air quality, water quality and supply, soil conservation, and wildlife protection.” The benefits of a green infrastructure network include:

- preservation of habitat and biodiversity support for plants and wildlife;
- conservation of natural ecosystem functions like water supply, flood storage, air and water purification, and maintenance of soil health and waterways;
- improved public health by allowing and encouraging active, healthy lifestyles;
- economic benefits such as increased local tax base and enhanced adjacent property values; prevention of flood damage; protection of farmland; increased tourism; and recreation-related businesses including retail and service occupations;
- protection of topsoil in order to sustain local farms; and
- allow for mitigation and adaptation to climate change

Hubs, Links, Sites, and Buffers

Green infrastructure is composed of conserved natural areas and features; public and private conservation lands; working lands of conservation value; and other protected open spaces. The green infrastructure network consists of hubs, links and sites:



Hubs, large or small, are an “anchor for green infrastructure networks and provide space for native plants and animal communities, as well as an origin or destination for wildlife, people and ecological processes moving to or through it.”² Hubs of open space also provide scenic views, promoting a sense of place and community identity.

¹ Benedict, Mark A. and Edward T, McMahon, 2002. *Green Infrastructure: Smart Conservation for the 21st Century*. Sprawl Watch Clearinghouse Monograph Series. The Conservation Fund.

² Benedict, Mark A. and Edward T, McMahon, 2002. *Green Infrastructure: Smart Conservation for the 21st Century*. Sprawl Watch Clearinghouse Monograph Series. The Conservation Fund.



A good example of a hub is the Jelkes Creek Bird Sanctuary, a 244-acre open space parcel acquired by Dundee Township in 2000 and 2001 as a gravel pit and since restored to prairie and wetland.

“This sanctuary is home to a variety of birds and provides a needed resting place for others that are migrating... Some of the water features were designed (to) capture the rain water and hold it until it can slowly

infiltrate through the gravel beds and native plant roots into the ground. This type of absorption cleans the water as it percolates through.”³

Links, also known as linkages, corridors, and greenways, connect the hubs and tie the system together, enabling the green infrastructure network to function. Links help maintain biodiversity and water quality; provide flood and stormwater control, and serve as the foundation for smarter growth and development. Along with environmental protection, links provide bicycle and pedestrian trail access between homes, shopping, schools, parks, and commuter rail and transit stations. When managed wisely, links or greenways along waterways are effective filter

strips that trap pollutants that The vegetation in helps remove reduces noise; and heat and winds. provide space for to function naturally stormwater flows.



sediment and damage water quality. links or greenways also pollutants from the air; moderates summer Links and greenways streams and wetlands and accommodate

The Kane County network of regional and local bicycle and pedestrian trails link destinations, allow for stormwater filtration along the Fox River and the creeks and enhance migration paths for wildlife.

³ Dundee Township website, <http://www.dundeetownship.org>.

Sites are smaller areas of green space that contribute important ecological and social values, but may not be attached to the network formed by the hubs and links.

The many neighborhood parks throughout Kane County are sites that can provide relief from urban spaces as well as habitat for wildlife. They may not be connected by links but contribute to the benefits the network provides. In the green infrastructure network, every connection strengthens the network further.

The connectivity of the green infrastructure network, through the concept of hubs, links, and sites, helps direct and coordinate acquisition, restoration, and management efforts. Enhancement of a green infrastructure network can be accomplished through coordinated green infrastructure initiatives at the regional, countywide, and local planning level.

Buffers are needed to protect the periphery of critical resources, such as important habitat areas. They reflect the sensitivity of resources and open spaces to adjacent lands uses. Buffers also provide mapping connections for natural resource areas that appear separate on a map but actually function as one.

Regional, Community, Neighborhood, Site

The Plan recognizes that green infrastructure initiatives should be undertaken at multiple spatial scales by local governments, agencies, organizations, businesses and private landowners in order to maximize benefits. Enhancement of the green infrastructure network can be accomplished at these four different scales:

Regional – Partnering with regional agencies and organizations. The development of the Kane County Bicycle and Pedestrian Plan was successful because of the efforts of a long list of local and regional partners.

Kane County Bicycle and Pedestrian Plan *Chapter 1: Introduction*

PLANNING PARTNERS

The following municipalities, governmental agencies and other organizations have participated in planning meetings and/or furnished information which was incorporated into the plan:

Kane/Kendall Council of Mayors	City of St. Charles
Kane County	Village of Sugar Grove
Kane County Forest Preserve District	Village of Virgil
Kendall County	Village of Wayne
Kendall County Forest Preserve District	Village of West Dundee
	City of Yorkville
Village of Algonquin	
City of Aurora	Batavia Park District
Village of Barrington Hills	Big Rock Park District
Village of Bartlett	Burlington Park District
City of Batavia	Dundee Township Park District
Village of Burlington	Elgin Parks and Recreation
Village of Carpentersville	Fox Valley Park District
Village of East Dundee	Geneva Park District
Village of Elburn	Hampshire Park District
City of Elgin	Huntley Park District
City of Geneva	Oswego Park District
Village of Gilberts	South Elgin Parks and Recreation
Village of Hampshire	St. Charles Park District
Village of Hoffman Estates	Sugar Grove Park District
Village of Huntley	Yorkville Parks and Recreation
Village of Lily Lake	
Village of Maple Park	Chicago Metropolitan Agency for Planning
Village of Montgomery	Pace
Village of North Aurora	Metra
Village of Oswego	
Village of Pingree Grove	League of Illinois Bicyclists
Village of Sleepy Hollow	Active Transportation Alliance
Village of South Elgin	Fox Valley Bicycle and Ski Club

Community – Incorporating principles of biodiversity, conservation and sustainability into and ordinances. The Elgin illustrate implementing green strategies.



Elgin's Lord Street Basin CSO Green Infrastructure Retrofit

local land use plans cities of Aurora and community efforts at infrastructure



Neighborhood – Promoting the preservation of natural spaces, people-friendly design and access to nature in developing communities. An example of this scale is the Mill Creek subdivision west of the City of Geneva that includes native landscaping and, preserves 45% of its land in open space and has a walkable/bikeable design.

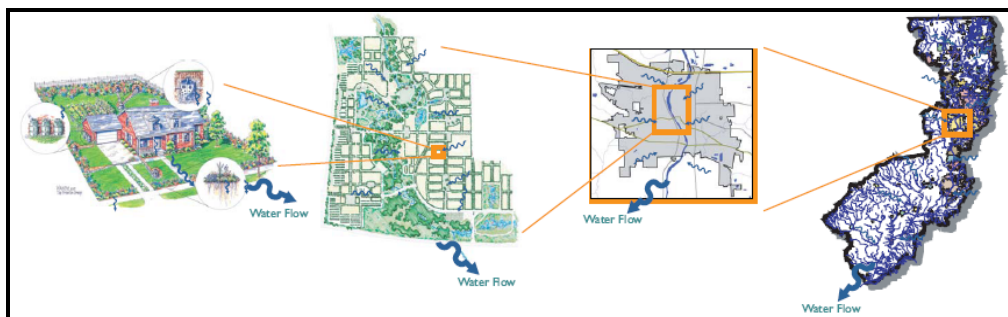


Site – Promoting the application of green infrastructure at the site or parcel scale through decentralized stormwater management practices such as green roofs, tree plantings, rain gardens, and permeable pavement that capture and infiltrate rain where it falls reducing stormwater runoff volume and improving the health of surrounding waterways.⁴ Permeable pavers provide stormwater management at the Kane County Government Center and Cougars Stadium in Geneva.

⁴ Chicago Wilderness. 2010. Green Infrastructure Vision 2010-12, Strategic Framework.

Eugenie L. Birch and Susan M. Wachter in their book *Growing Greener Cities*, discuss the value stormwater can bring to communities through the use of Best Management Practices (BMPs) at the site scale by integrating with conventional technologies at the neighborhood, community and regional scales:

- rain gardens
- disconnected downspouts
- rain barrels
- green roofs/ permeable paving
- tree plantings
- native vegetation
- vegetated swales
- planter boxes
- filter strips
- naturalized detention basins



Cost Effectiveness

While green infrastructure is becoming a widely accepted alternative development approach on the merits of its environmental benefits, questions of its cost effectiveness – in comparison to conventional grey infrastructure approaches – continue to be raised. Fortunately, there is growing documentation, regionally and nationally, supporting the conclusion that the long-term costs of green infrastructure are generally less than or equal to the costs of grey infrastructure.

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

Reduced up-front costs: Some green infrastructure approaches reduce or eliminate the need for expensive gray 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 gray 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 much 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 some green are much less counterparts. A landscaping in While most turf regular mowing established require relatively maintenance. require long-term weeds and a regular schedule of controlled burning, but these costs are substantially less than maintenance costs for most turf installations.



maintenance costs of infrastructure practices expensive than their gray good example is natural comparison to turf grass. installations require and irrigation, well-natural landscapes little long-term Natural landscapes do spot control of invasive

Multiple benefits: While most gray infrastructure practices have a single purpose, 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.

Add photo

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. *See Appendix 1 Strategic Conservation Makes Economic Sense – Local Green Infrastructure Case Studies*

Kane County and Green Infrastructure

Regional Green Infrastructure Vision

Chicago Metropolitan Agency for Planning

Implementation and enhancement of a green infrastructure network can be accomplished through coordinated green infrastructure initiatives at the regional, countywide and local planning level. The Chicago Metropolitan Agency for Planning (CMAP), created in 2005, is the official regional planning organization for northeastern Illinois. CMAP's GO TO 2040 Plan, the region's first long-range comprehensive plan, covers a wide range of issues and includes numerous recommendations relating to green infrastructure:

1. protect valuable green space;
2. control flooding;
3. improve water quality;
4. replenish water supply;
5. protect habitat;
6. encourage local food production; and
7. integrate into site planning⁵

CMAP continues to partner with local governments and organizations throughout the region to implement these recommendations.

Chicago Wilderness

One of these partners, Chicago Wilderness (CW), an alliance of organizations that champion biodiversity and its contribution to the quality of life in the urban, suburban and rural areas of the Chicago Metropolitan region, developed the original Green Infrastructure Vision (GIV) in 2004. "The GIV identifies 1.8 million acres that can be restored, protected, or connected through conservation and thoughtful, sustainable development practices. The GIV guides the protection and development of an accessible, interconnected network of healthy ecosystems that contribute to economic vitality and quality of life for all the region's residents."⁶ Large Resource Protection Areas were identified as well as recommendations for land preservation, ecological restoration, and development restrictions.

⁵ Chicago Metropolitan Agency for Planning, GOTO 2040 Plan.

⁶ Chicago Wilderness website, <http://www.chicagowilderness.org>

The next generation regional green infrastructure map or GIV 2.0, completed in 2012, added detail to the original. Described as a visual representation of the Chicago Wilderness Biodiversity Recovery Plan, GIV 2.0 is a classification and characterization of important resources; and an identification of connectivity opportunities. GIV 2.0 provides “a set of GIS tools for conservation partners in the region to use to identify portions of the green infrastructure network on which they wish to concentrate their efforts.”⁷ These tools have been developed for use by conservation organizations, municipal land use planners, developers, transportation engineers and others in order to protect the green infrastructure network.

GIV 2.0 identifies ecosystems that provide high quality habitat for native plants and animals as well as nearby lands that contribute to ecosystem services such as clean water, flood control, carbon sequestration and recreational opportunities. Links or corridors that provide opportunity for animal, plant and human movement are also identified. These links are beginning to prove essential as an adaptation to climate change.

In order to implement GIV 2.0, Chicago Wilderness created the Sustainable Watershed Action Team (SWAT). SWAT consists of planning, engineering, stormwater and other professionals who provide planning technical assistance to local governments and developers interested in green infrastructure and sustainable development. In addition to Kane County and the creation of the Kane County 2040 Green Infrastructure Plan, SWAT has provided assistance to numerous communities and counties in the region including the Village of Campton Hills in Kane County.

Concerned about protecting and maintaining their natural resources, in 2010 the Village of Campton Hills prepared and adopted a Green Infrastructure Map with the help of the Sustainable Watershed Action Team funded through Chicago Wilderness. The map covers the Village’s 1 ½-mile Planning Jurisdiction Area and was prepared with GIS analysis using existing natural resource maps, including

Chicago Wilderness Biodiversity Recovery Plan goal: to protect the natural communities of the Chicago region and to restore them to long-term viability, in order to enrich the quality of life of its citizens and to contribute to the preservation of global biodiversity.

⁷ Refinement of the Chicago Wilderness Green Infrastructure Vision, 2012.

streams, wetlands, watersheds, floodplains, existing public and private open space, aquifer and fen recharge areas, etc. The map will be used to inform policies in the Village's comprehensive plan update as well as a tool to help the Village make wise development decisions with water recharge as a major component.⁸

Add graphic

Tree preservation is a valuable tool in the green infrastructure tool kit. Chicago Wilderness and the Morton Arboretum have partnered to create the Trees and Green Infrastructure Task Force with the purpose of:

1. Identifying and promoting the ecosystem benefits of trees;
2. Understanding the role of trees in wetlands, woodlands, savannas and prairies; and
3. Understanding, planning for, and communicating the reciprocal benefits and impacts of trees and restoration activities

In 2010, as part of the Task Force, the Morton Arboretum conducted a Regional Tree Census which surveyed 1331 plots throughout the Chicago Region outside the city limits. The Census revealed that our regional forest is in a state of "transition". This transition involves invasive species which comprise nearly 30% of our regional forest including the loss of 8% of our forest due to emerald ash borer. In order to address this threat the Regional Trees Initiative was formed. The Regional Trees Initiative is a regional coalition of organizations working to develop a management strategy to build a healthy, vibrant forest for our future. The Trees and Green Infrastructure Task Force, as part of the Regional Trees Initiative, is working within the framework of Chicago Wilderness to develop a management plan for the CW region. This taskforce is comprised of approximately 100 different organizations including Kane County.

In addition, the CW Trees and Green Infrastructure Task Force is developing an interactive tree benefit guide for homeowners and has initiated the Oak Recovery Project for the CW region. Trees can contribute significantly to human health, environmental quality and quality of life. The Regional Tree Census determined that oaks are the dominant tree in the region and play a major role in woodland and savanna ecosystems. However, their numbers are declining and not being

⁸ Green Infrastructure in the Village of Campton Hills. 2010. Prepared by Trotter and Associates, Inc. Adopted 2011.

seen in diverse age classes in our woodlands. The Oak Recovery Project will include management strategies to restore our natural heritage for the future.

Add Summary of Urban Forest Features, Kane County, 2010 (when received)

In 2011 Chicago Wilderness received a grant from the U.S. Forest Service to assess the oak resources of northeast Illinois and implement a cooperative strategy to restore oak dominance to the Region’s tree canopy. Because oaks are considered to be a keystone species in northeastern Illinois, they are driving much of the biodiversity in the region. Oak systems are under intense pressure from a number of threats including habitat fragmentation, development, cutting, invasive species, changing climate, and lack of management. The Illinois Forest Action Plan, a strategic plan for the state’s forests that addresses threats and improved forest health, defines oak decline as a major threat to forest resources.

The objectives of the project are to:

1. Map the location and extent of existing oak resources across all counties;
2. Engage government, non-profit, corporate, and private stakeholders to develop a comprehensive plan to recover the oak ecosystems; and
3. Establish the first phase of a regionally-coordinated initiative to scale up successful, locally-based conservation delivery programs to improve oak populations.

The first objective was completed for Kane County in early 2012 using presettlement vegetation information based on the public land survey notes from the early 1800s, 1939 aerial photography, soils data and aerial photography from 2011. Oak woodlands greater than one acre were included. Specific data are included in Table #1. 55% of the oak woodlands in Kane County that existed in 1939 remained in 2011.

Table #1 Remnant Oak Woodlands

<i>1939</i>	<i>2011</i>
25,906 acres or 40.48 sq. miles	14,278 acres or 22.31 sq. mi.
	55% < 5 acres
	48% < 4 acres
	36% < 3 acres
	20% < 2 acres

The data illustrated on this Map will be combined with similar data from across the region and allow project partners to identify potential oak woodland reforestation and restoration opportunity areas, considering factors such as existing oak species, soil type, current land use and other local data. These opportunity areas will form the basis for the regional oak ecosystem recovery plan.

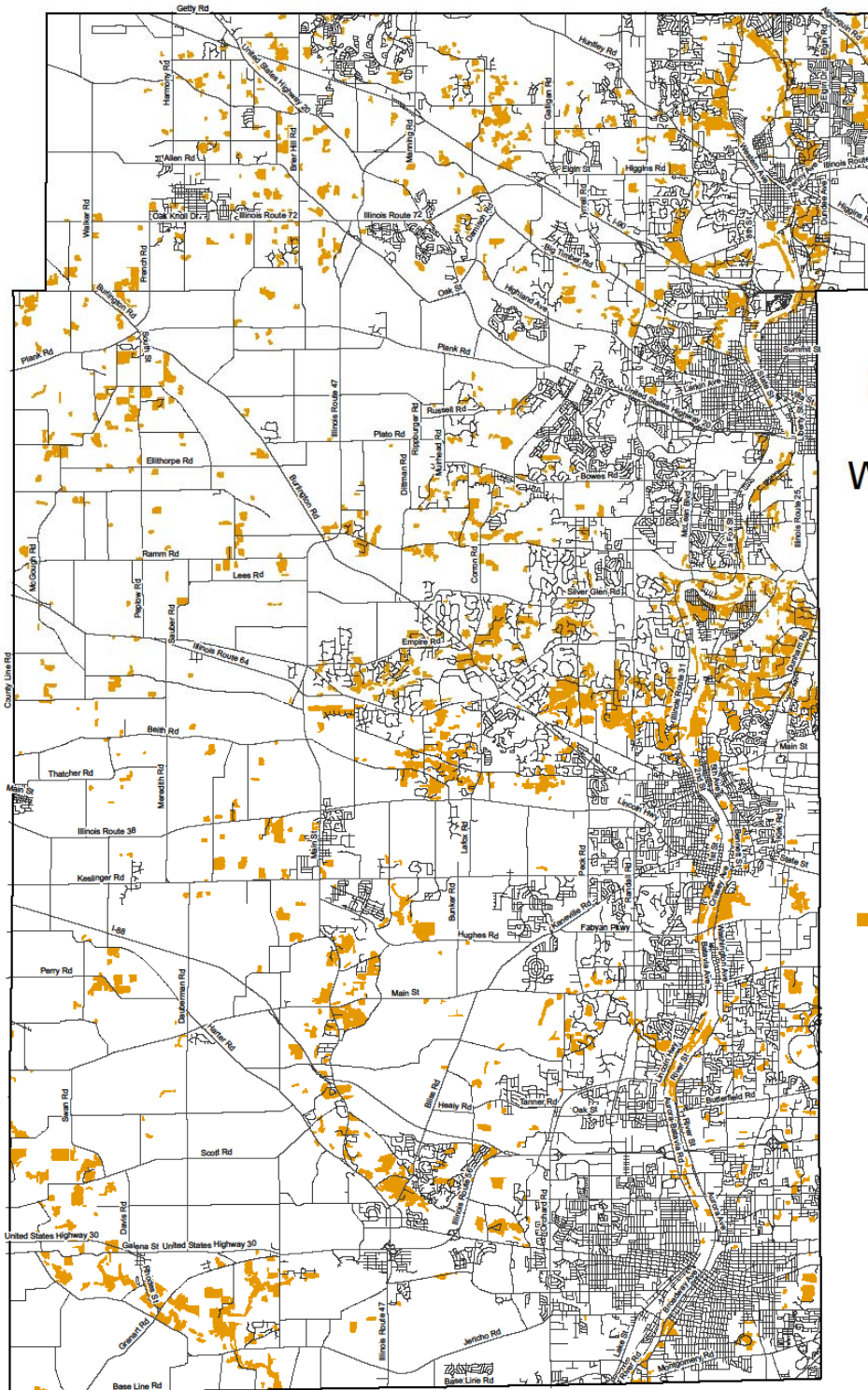
Climate change action is a central initiative of Chicago Wilderness and a critical issue when discussing green infrastructure. The Climate Change Task Force was established in 2007 after recognizing that the potential impacts of climate change will likely amplify current management challenges addressing invasive species, habitat fragmentation and pollution and may jeopardize all conservation investment that has taken place in the local Chicago Wilderness region.

To better understand these changes and help communities prepare for them, Chicago Wilderness has produced a Climate Change Update to the Biodiversity Plan originally produced in 1999. This document is intended to be a detailed reference tool that supports the development of specific adaptation strategies for the natural communities of Chicago Wilderness.

Chicago Wilderness recognizes the importance of being aware of the need to adapt to, and where possible, mitigate the effects of climate change to reduce the potential for further damage to the region's biodiversity. The Climate Action Plan for Nature links biodiversity to conservation and proposes responsive first steps for the conservation community to assure that our biodiversity is not threatened:

- 1.** Mitigate the future impacts of climate change by reducing the amount of greenhouse gases in the atmosphere.
- 2.** Make our region's natural areas resilient in the face of inevitable climate change impacts
- 3.** Engage the Chicago Wilderness community in action, organizing the alliance's vast network of conservation experts to create local solutions that have global impact.

Kane County Remnant Oak Woodlands



Remnant Oak Woodlands >1 acre

Remnant Oak Woodlands (2011)



Northwest Water Planning Alliance (NWPA)

The Northwest Water Planning Alliance was created in 2010 after Kane County initiated discussions regarding the lack of authority for local governments to regulate water withdrawals and water supply planning. The NWPA utilizes intergovernmental agreements among the counties of Kane, Kendall, DeKalb, McHenry and Lake and five Councils of Government representing approximately 80 communities that do/will not rely on Lake Michigan Water. Water conservation and efficiency was one of the two goals addressed.

Northeastern Illinois Regional Water Supply/Demand Plan – Water 2050

Completed in 2010 and facilitated by CMAP, Water 2050 recognizes that the water supply planning issues in Kane County and other collar counties that rely on inland surface water or groundwater for drinking water are different than in the Lake Michigan service area.

Kane County 2040 Plan

In May, 2012 the Kane County Board adopted the Kane County 2040 Plan (2040 Plan) with the theme of “Quality of Kane – Healthy People, Healthy Living, Healthy Communities.” The 2040 Plan proposes vision and direction for the Kane County Board and the County’s 30 municipalities to plan for growth and to improve the quality of life. It integrates the planning efforts for land use, transportation and health. Among the shared values commonly held by the County’s residents relating to the benefits of green infrastructure:

- dedication toward maintaining valuable open space;
- a countywide trail network that is second to none providing opportunities for exercise, transportation and community connectivity;
- where residents enjoy the beautiful Fox River as part of their community – for biking, walking trails, and other recreational activities such as fishing and kayaking;
- a network of forest preserves capturing the scenic beauty of the Midwest; and
- where every resident can enjoy the benefits of the gently rolling countryside, fertile farmland and local fresh farm products.

Comprehensive planning has been a continuous function of Kane County government for over 50 years. Open space protection and the greenway network have strong roots in Kane County policy dating back to the 1967 Five Point

General Development Policy which identified development goals that addressed employment, people, housing, the environment and natural resources to be used as a basis for countywide planning. The 1976 Comprehensive Plan called for a countywide greenway system to protect natural areas. The 1982 Comprehensive Land Use Plan continued the greenway system and stressed the need to preserve remaining natural areas, to provide connections between open spaces, and to ensure a full range of recreational opportunities.

The 2020 Land Resource Management Plan introduced a bold, comprehensive approach to open space preservation as it described the Kane County open space system as the “armature of the 2020 Plan – a combination of large and small green spaces with the Fox River and its greenways as the backbone” and stated “it is crucial to acquire and protect sufficient open space to meet the County’s needs into the next century. Therefore, the 2020 Plan takes a *bloodthirsty* approach to the implementation and preservation of the open space system in Kane County.” “Bloodthirsty” became a controversial description as the County moved forward to the 2030 Plan but was definitely memorable as it emphasized the importance of open space preservation in Kane County’s future.

The 2030 Land Resource Management Plan aggressively promoted and further implemented the countywide greenway planning tradition with the goal to protect 50% of the land area in Kane County in agricultural and open space uses in spite of the unprecedented population growth and community development.

Continuing this legacy to 2040, ***Kane County commits to aggressively promote an open space armature and greenway system, sometimes referred to as the green infrastructure network. Kane County reaffirms the commitment to open space and farmland preservation with the general goal that by 2040 at least 50% of the land in Kane County should still be in farmland and open space uses.***

Add 1840 Landscape Map

Building on the map of Kane County’s 1840 Landscape, high priority areas for preservation, protection, management and restoration were identified and the following Chicago Wilderness strategies offered:

- Creation of large preserves
- Creation of community mosaics
- Protection of priority areas, especially remaining high-quality sites

- Protection of any large sites with some remnant communities
- Protection of land that connects or expands existing natural areas
- Expansion of public preserves, acquisition of large new sites, and/or protection through the actions of private land owners where possible

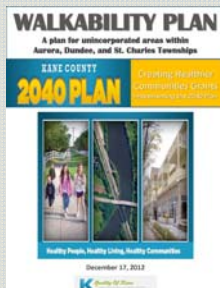
Kane County supports a built environment that is carefully planned, promotes healthy choices, improves quality of life, and enhances and preserves natural resources. The County's *Making Kane County Fit for Kids* initiative, launched in 2008, addressed the childhood obesity epidemic by creating strategic action principles that include developing land use, planning and other public policies that foster and support physical activity and the accessibility of fresh fruits and vegetables. The green infrastructure network provides opportunities for physical activity by including trails and recreational areas; the incorporation of community gardens that supply fresh fruits and vegetables; cleans the air and water; and mitigates the effects of climate change by cooling the air, basics to maintaining good health.

The 2040 Plan also emphasizes the importance of providing more opportunities for County residents, employees and visitors to use healthier travel options, such as walking and biking. Decreasing vehicle miles traveled by motorized vehicles also decreases greenhouse gas emissions resulting in cleaner, healthier air and water.

The Development Department created a Walkability Plan for three unincorporated areas within Aurora, Dundee and St. Charles Townships through a Power of Policy Grant. A Feasibility Study was completed on one of the four routes in St. Charles Township, Weber Dr. between the Fox River Bluff Forest Preserve and Fox River Dr.

Agriculture continues to be the predominant land use in unincorporated Kane County. A land use survey completed by the Development Department in 2011 indicated 68% or 137,558 acres of unincorporated Kane County is in agriculture. Agriculture is considered to be an integral part of the County's economy, landscape and natural resource base.

A new land use category, Protected Agriculture/Limited Development was introduced in the 2040 Plan as a form of conservation design which provides for clustering of residential lots on a portion of



the site and permanently protecting the remainder of the land for agriculture and open space. Protected Agriculture/Limited Development is typically designed with sustainable features so as to minimize adverse impact on the surrounding farm operations and agricultural heritage. This special and unique development is restricted to certain geographic areas; has a mix of soil types and a variety of topographic and geological features that may include wetlands, streams, waterways, wooded areas, and wildlife corridors; and encourages green development, design and building practices. This new land use category is an opportunity for the agricultural community to partner in extending and enhancing the green infrastructure network into the Agricultural/Food, Farm, Small Town Area of Kane County and offers additional opportunities for the expansion of locally grown and produced food.

The first development approved under this new land use category is Serosun Farms in northwestern Kane County. Serosun Farms will include an organic farm, an equestrian center, single family housing, and preservation/restoration of natural resources and reduction of the community's carbon footprint by providing 70-80% of their energy through renewable on-site sources.

Add graphic of Serosun Farms

Recognizing the important role the environment plays in health and building on a strong planning tradition, Kane County moved forward to improve health by increasing the number of small farmers producing and selling fruit and vegetables locally, decreasing the expansion of suburban sprawl, and continuing to improve economic prospects for county residents and organizations. With these ideas, Kane County created the Growing for Kane Program which helps support farms producing fruit, vegetables, dairy and meat for local residents in all locations: rural, suburban and urban; and on all size parcels throughout the county. Parcels and areas identified in the Green Infrastructure plan may be suitable for growing; along with land protection through an agricultural conservation easement.

One of the major challenges in the 2040 Plan is the increasing demand for water due to a growing County population and finding adequate and sustainable water supplies for both human and ecosystem needs. Green infrastructure has and will continue to provide services that address stormwater runoff quantity and quality and groundwater recharge, important issues when considering water supply planning for the current and future population of Kane County.

Kane County acknowledges the value of an integrated water resource planning process for guiding and developing water resource plans. Integrated water resource planning identifies “the most efficient means of achieving the goals while considering the costs of project impacts on other community objectives and environmental management goals.”⁹ The 2040 Plan describes how integrated water resource planning can be used to address water supply, wastewater and stormwater issues.

Kane County Stormwater Management Plan and Stormwater Ordinance

The volume and rates of stormwater runoff have increased greatly since pre-settlement times. This is due to farming activities that have drained fields and channelized streams, and to urbanization that has increased impervious surfaces and compacted soils.

Past stormwater management practices have resulted in a substantial increase in flooding and stream bank erosion, and have caused severe water quality problems. Water may be polluted from street and parking lot runoff containing heavy metals, bacteria, excess nutrients and petroleum byproducts.

Record flooding in Kane County in July, 1996 brought about the adoption of the Comprehensive Stormwater Management Plan for Kane County in October, 1998. The goals of the Plan call for a uniform stormwater management framework addressing both the quantity and quality of surface and groundwater resources.

The Kane County Stormwater Management Ordinance is a product of the Plan and became effective in January, 2002 with subsequent amendments. It provides the means for cost effective, safe, aesthetic, and reasonable stormwater drainage and erosion control that minimizes stormwater runoff, water quality degradation, and habitat loss. It also encourages and/or requires the implementation of best management practices to protect water quality, stream corridors and wetlands for both incorporated and unincorporated areas.

One of the policies in the Kane County 2040 Plan is to review and periodically update the Comprehensive Stormwater Management Plan and Kane County Stormwater Management Ordinance to incorporate new planning goals, new

⁹ American Water Works Association, Manual M50, 2001.

technology, updated regulations, new methods and green infrastructure systems and techniques.

In order to increase the amount of open space available for green infrastructure and to reduce impervious cover, development can be designed at a higher density. In the following graphic the USEPA illustrates how increasing density in the context of watershed management can mitigate the impacts of impervious cover by reducing the impervious area per capita and thereby decreasing overall impervious cover.

Add 10,000 Acre Watershed Accommodating 10,000 Houses graphic Kane County Watershed Planning

According to the 2030 Kane County Land Resource Management Plan, watershed planning is the most effective means of addressing countywide water quantity and quality. Watershed planning:

- Promotes a collaborative eco-system based approach to environmental and land use planning at the watershed level.
- Gives government agencies, land developers, and agricultural operators specific water protection guidelines.
- Shifts water resources planning to a proactive approach that stresses protection, preservation and enhancement of the environment, rather than short-term costs or remediation of existing problems.
- Places emphasis on the health of the environment, sustainability and the hydrologic cycle.

The U.S. Clean Water Act (P.L.92-500) requires the preparation of area wide plans for controlling water pollution from all sources in urban-industrial areas. Primary responsibility for preparing these plans within the Fox River Watershed has been assigned to CMAP. The Illinois Environmental Protection Agency (IEPA) entered into an agreement with CMAP in 2010 to develop watershed-based plans for Blackberry Creek, and Ferson-Otter Creek with support from the Fox River Ecosystem Partnership and the Conservation Foundation. The Kane-DuPage Soil and Water Conservation District received a grant from IEPA to complete the Jelkes Watershed formally referred to as the Jelkes Creek-Fox River Watershed Plan.

“The fundamental purpose of the watershed-based plan is to evaluate and recommend the best measures to help restore the beneficial uses in...Creek, with

the long-term goal of improving conditions enough that ...Creek can be removed from the Illinois Section 303(d)list “¹⁰ which designates impaired water bodies.

Each of the three Plans includes a Green Infrastructure Framework that “details the types of activities that may maintain and enhance water quality if undertaken by various stakeholders, primarily local governments.”¹¹ Three categories are used to describe lands within the watershed:

1. Open Space Reserves
2. Planned Development
3. Developed Land

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The Plans identify projects that may benefit the green infrastructure network in that particular watershed and consequently enhances Kane County green infrastructure as a whole. One example is Settler’s Ridge.

Settler's Ridge in Sugar Grove was conceived as a 1300 acre lifestyle community in Sugar Grove. While Sugar Grove doesn't mandate conservation design in its ordinances, negotiations for this project led to a conservation-oriented plan. The motivation was based, in part, on the recommendations of a watershed study for Blackberry Creek which flows nearby the property (Conservation Design Forum, 2003) and the desire of the developer and land planner to create a distinctive community.

Add graphic of Settler’s Ridge

Starting with a concept plan designed with national award-winning conservation land planner Randall Arendt, a land plan was developed for the 500+ acre first phase that blended conservation design and traditional neighborhood design themes. The existing site was almost entirely cropland with few natural remnants, except for some small degraded wetlands. However, much of the site was underlain by hydric soils, indicative of former wetlands. The resultant land plan preserved 40 percent of the site as open space, the bulk of it in restored or created wetland and prairie zones, mostly in the formerly drained hydric soils. Stormwater facilities were designed as naturalized lakes and wetlands, surrounded by prairie buffers. While the local subdivision ordinance generally requires storm sewer drainage, flexibility was provided to allow for the use of swales and bio-swales in several neighborhood locations. Settler’s Ridge also

¹⁰ Blackberry Creek Watershed Action Plan, December, 2011.

¹¹ Blackberry Creek Watershed Action Plan. December, 2011.

includes an extensive trail system that will ultimately connect with the regional Virgil Gilman Trail.

Previously, plans for Tyler Creek and a poster for Big Rock were completed. Currently, a plan for the Union/Virgil Ditches, within the Kishwaukee River watershed is under development.

Open Space and Green Infrastructure in Kane County

Open space is the counterpart of the built environment. Open space often contains natural resources that are too valuable to lose. Along with environmental protection, open space provides recreational opportunities, visual beauty, spiritual enrichment and educational opportunities.

Kane County's greatest open space asset is the Fox River. A major natural resource of the region, the Fox River is a significant greenway or linkage within the green infrastructure network consisting of wildlife and aquatic habitat, as well as a recreational feature. The appearance of the riverfront has improved greatly since the time when heavy industries and junkyards were located along its shoreline. The municipalities have recognized the Fox River as an open space and community amenity by acquiring riverfront acreage and designing riverwalks and trails to link housing, parks, shops, offices and restaurants in their downtowns. Such development beautifies the downtown center as well as revitalizes the economy.

Located on the western edge of the Chicago metropolitan region, Kane County continues to experience pressure on land for conversion from agricultural land and open space. Since 1970, open land in the region has been consumed at an alarming rate. In response, the Chicago metropolitan region has proactively preserved 300,000 acres of open space (as of 2010), including county forest preserves, township parks, municipal parks, private conservation easements, private nature preserves, and state and federal holdings.¹²

Kane County's greenway preservation program is part of a long standing tradition in the metropolitan area that includes Chicago's lakefront park system, the boulevard system, and forest preserve acquisition along the Chicago, Des Plaines, DuPage and Fox Rivers. The Forest Preserve District of Kane County began open

¹² Chicago Metropolitan Agency for Planning. 2010. GO TO 2040 Plan.

space conservation in 1926 with the acquisition of Johnson's Mound Forest Preserve and presently holds over 19,000 acres. Since 1999, Kane County has passed four open space referenda totaling \$260 million.

Add FP photo

District owned Forest Preserves, open space, and natural areas serve four primary purposes:

1. preserve natural resources;
2. provide recreation and education resources;
3. structure the form of urban development; and
4. restore natural areas.

The majority of Forest Preserve holdings are comprised of mixed grasslands (old farm fields, wetlands, turf grass, hayfields), woodlands, and agricultural land. The Forest Preserve places its highest land acquisition priorities on land that contains natural features and has restored over 1,137 acres of preserve land to native prairies grasses.

Other significant open space acquisition efforts in Kane County include open space protection programs by Dundee and Campton Townships. Through referendum and grant efforts Dundee Township purchased 862 acres of open space on eight sites, comprised of wetlands, dry hill prairie, forest, fen and farmland. Volunteer site stewards and grant funds resulted in restoration of the sites. Key objectives of the Dundee Township open space program are to enhance groundwater supplies by infiltrating the maximum amount of rainfall on each site; to improve habitat by planting native species; and to encourage passive recreational use and public appreciation of native Illinois flora and fauna. Dundee Township recognizes the importance of the oak tree as a keystone species by managing their woodlands to foster the growth of oaks and other native trees and woody vegetation. The oak/ hickory woodland at Raceway Woods is one of the largest remnants in the County. The Township completed a mass planting of 4,000 native saplings at Dixie Fromm Briggs several years ago. A majority of the saplings were oak species. Volunteers and staff continue to plant 20 to 30 oak saplings each year and are conscious about buying locally and factoring in the effects of climate change.

Add The Great American Oak poster.

In Campton Township, the citizens approved two referenda for open space preservation. The objective of the Campton Township Open Space Plan is to acquire open land for passive and active recreation purposes and to protect

farmland, historic landmarks, scenic roadways, wetlands, woodlands, wildlife, and geographically significant features. The over 1,000 acres preserved include the headwaters of Blackberry Creek, and the historically significant Corron Farm. The Township has also restored a number of lands formerly in agricultural use to their former native prairie and wetland habitats, improving the health of local watersheds.

There are 11 park districts in Kane County that own and maintain open space for the purpose of preserving natural resources, providing recreational and educational opportunities and improving the quality of life for residents of the County. Over 4,240 acres (6.62 square miles) of land in Kane County is maintained by the various park districts. The Park Districts play an important role in addressing the issue of protecting open space and natural areas and have been instrumental in enhancing and expanding Kane County’s green infrastructure network. St. Charles and Fox Valley Park Districts are notable for their efforts to preserve and restore natural areas and greenways.

[Add PD photo](#)

The Northeastern Illinois Water Trails Plan, developed by Openlands and the Northeastern Illinois Planning Commission (NIPC), includes the Fox River. The Plan illustrates the role our rivers and creeks play as part of the region’s green infrastructure network in terms of recreation, stewardship, eco-tourism, education, and economic benefits.

The Kane County bicycle/pedestrian system, the main component of the Kane County Bicycle Pedestrian Plan is comprised of over 310 miles of trails established by the Forest Preserve District of Kane County, local municipalities and park districts and is one of the most extensive systems in the Midwest. The system includes both regional and local trails:

Regional Trail System – typically more than three miles in length and crosses into more than one municipal jurisdiction. It links bicyclists to destinations via long, street separated trails that can be used for both community and recreational rides.

Regional trails include the Fox River Trail, the Great Western Trail, the Illinois Prairie Path and the Virgil Gillman Trail.

Local Trail System – typically a smaller trail used for local recreation or destination, it is less than three miles, serving one community or a single neighborhood.

There are numerous local trails throughout Kane County.

The trails are used for a variety of recreational activities as well as alternative commuter routes. They offer hikers and bikers the opportunity to pass through and over woodlands, prairies, farmland, streams, creeks, the Fox River, wetlands, and urban, suburban and agricultural cities and villages. One distinct benefit is that bicycling and walking contributes to improving our air and water quality by reducing energy consumption and the growth of motor vehicle congestion while generally enhancing a positive quality of life. In addition, the trails provide links and corridors, an important component of the green infrastructure network.

The Active Transportation Alliance, formerly the Chicagoland Bicycle Federation, “works to improve conditions for bicycling, walking and transit and engage people in healthy and active ways to get around.”¹³ The Alliance’s Complete Streets, Complete Networks: A Manual for Design of Active Transportation includes a chapter on Green Infrastructure that recognizes the importance of street trees and landscaping to enhance “the comfort and safety of people who live and travel along the street.”¹³ The chapter focuses on the value of trees, bio-swales, urban rain gardens, and urban agriculture (community gardens) to address stormwater and climate change concerns.

Private individuals or nonprofit organizations such as The Conservation Foundation may place conservation easements on a piece of land so that it’s natural features are permanently preserved. Through this legal technique the property owner retains ownership while waiving some of his/her development rights. Conservation easements can protect natural areas that function as greenways and habitat corridors and other sensitive areas such as wetlands, floodplains, ridgelines, slopes and viewsheds.

The City of Elgin’s Sustainability Action Plan addresses “opportunities for recreation, while at the same time protecting and enhancing the regional waterways, expanding native plantings and wildlife areas, as well as improving the overall livability of the city of Elgin. The focus has been to analyze the existing waterways, study opportunities for improving the water’s edge, develop recommendations for a long-term protection plan, offer suggestions regarding storm water runoff, as well as propose an on-going educational program for the protection of the waterways and natural habitats.”¹³

Add photo or graphic

¹³ City of Elgin, Sustainability Action Plan.

As the County and municipalities continue to face growth pressures, the preservation of open space and the expansion of green infrastructure will be key to achieving livable, sustainable and healthy communities. The previous examples show the commitment Kane County residents demonstrate to protecting the natural resources.

Developing the Kane County 2040 Green Infrastructure Plan

Introduction

Chicago Wilderness, through a grant from Boeing, announced funding for green infrastructure planning in three priority areas of the Chicago region using its well-established Sustainable Watershed Action Team (SWAT) program. The targeted areas include:

1. Kane County
2. The Kishwaukee Watershed in southeastern Winnebago County
3. The Midlothian Creek Watershed in the communities of Blue Island and Robbins in southern Cook County

In addition to the recent SWAT green infrastructure planning, similar efforts were funded in McHenry County and a number of municipalities and townships in northeastern Illinois.

Kane County was specifically chosen for project funding because of its predisposition to ecologically sensitive land use planning, including a strong interest in green infrastructure. Such advanced thinking is an essential ingredient in the success of the SWAT process, which obtains funding for consulting experts to provide project assistance in resource sensitive land planning.

Kane County Planning Staff and SWAT created a Green Infrastructure Map using existing resource inventories and input from area resource experts, local jurisdictions and other stakeholders. The Map compliments and expands upon relevant resource mapping in the Open Space and Green Infrastructure Chapter of the 2040 Plan. In collaboration with Kane County Staff, the Kane County Planning Cooperative, stakeholders and input from the public, SWAT will assist in the development of specific green infrastructure implementation recommendations.

The green infrastructure planning process engages the Kane County 2040 Plan's *Kane County Planning Cooperative* that includes partners from around the County and region working together to implement the 2040 Plan. The process also includes approval by the Regional Planning Commission and the Energy and Environment Committee of the Kane County Board as well as adoption by the full Kane County Board.

Green Infrastructure Mapping Process

One of the products of the green infrastructure planning process was of the Green Infrastructure Map. Kane County Staff and SWAT using Geographic Information System (GIS) technology compiled and reviewed a list of existing natural resource maps and data sources available from the Development and GIS Departments. Additional maps and data and their sources were added to the list of potential core layers of the draft Existing Resources Inventory Map.

Natural resource experts from Kane County and the region were enlisted to provide input on the core layers to be included in the Map. The first meeting of the Natural Resources Advisers was held on August 16, 2012 to review the draft Existing Resources Inventory Map and recommend additional green infrastructure priorities and approaches. *See Meeting Notes in Appendix 2.* Following is the list of agreed upon core layers. *See list of Core Layers in Appendix 3 for detailed descriptions:*

- Water
- ADID Wetlands and Streams
- 200 Foot Buffer
- Hydrologic Atlas (HA)
- FEMA 100-year Flood Hazard Areas (2012)
- Remnant Oak Woodlands
- INAI Sites
- INPC Sites
- T &E Species
- IDNR Biological Stream Rating
- NRCS Farmed Wetlands (2004)
- Forest Preserves
- 2040 Plan Open Space
- Fen Recharge Areas
- Aquifer Sensitivity Areas
- Class III Groundwater Recharge Areas
- Hydric Soils

Kane County is also a recipient of a U.S. Forest Service State and Private Forestry Grant through Chicago Wilderness to map the historic (1939) and current (2011) extent of oak communities in northeast Illinois. This data was used as an additional layer of the Existing Resource Inventory Map and provides the means to develop a strategy to restore the oak canopy as part of the Kane County 2040 Green Infrastructure Plan. See Appendix 5.



A second meeting of the Natural Resources Advisers was held on January 29, 2013 to review adjustments and additions to the draft Existing Resources Inventory

Map. The group also discussed “mapping rules” to determine buffer widths, connectivity, minimum sizes, etc. Input from this meeting was used to develop the Green Infrastructure Map. *See Meeting Notes in Appendix 2. See list of Mapping Rules in Appendix 4.*

Supporting layers of data may prove beneficial when implementing projects. Specific water resource elements are important to consider when siting certain green infrastructure investments. *See Appendix 5 for Additional Water Resource Elements not included in the Core Layers.*

On March 8, 2013, the Natural Resources Advisers participated in a day long workshop designed to review the most recent edition of the draft Green Infrastructure Map, including the mapping rules decided upon at the previous meeting. The suggested changes/additions were manually marked on the map and a township and number was recorded for each. Correspondingly, explanatory notes were recorded for each mark-up. *See Meeting Notes in Appendix 4.*

[Add photo of meeting with the Big Map](#)

In order for the Advisers to be able to view significant details and mark edits where necessary, the Map was printed at a scale that resulted in a finished map of 13 feet by 18 feet! At the workshop the group was tasked with:

1. Adding missed resources, such as newly protected public open spaces.
2. Removing mapped resources that do not meet the definition of green infrastructure. For example, if a flood-of-record is in an area that has been subsequently urbanized, resulting in the elimination of a watercourse or its apparent capture in a storm sewer, it should be eliminated from the map.
3. Making connections to adjacent green infrastructure resource areas to establish connectivity. If adjacent resource areas are within 200 feet, a connection (or corridor) was previously identified between the resources. Professional judgment was used at times to extend the connection distance.
4. Aggregating isolated resource polygons into larger, functional systems. Notably, areas of potential organic soils were identified for addition to the core GI map where they enabled connections between adjacent wetlands and/or provided opportunities for strategic, large-scale wetland restoration.

5. A number of schools or other institutional properties were identified to be part of public or private open space mapping, even though they were largely impervious in nature. These sites, or appropriate high impervious portions of them, were systematically removed from the Map.

After the workshop, staff updated existing conservation easements; developed an overlay map of organic soils and wetlands to identify areas of possible wetland aggregation of isolated wetlands with floodplains and associated remnant woodlands and other habitat areas; and deleted isolated, unconnected detention basins. Once the changes/additions were made, staff screened isolated complexes of less than 50 acres. These smaller isolated resources are identified with appropriate symbology (e.g., wetlands and woodlands). They are not included in the aggregated core “green” mapping on the final map.

The final Green infrastructure Map includes the following green infrastructure categories which are aggregated from the more detailed mapping layers described above:

- Parks, Preserves & Conservation Areas (with buffer)
- Private Open Space (with buffer) 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 subdivision common areas, golf courses, and camps as well as privately owned properties that are permanently preserved such as IDNR Nature Preserves, IDNR Land and Water Reserves, and conservation easements. These areas typically are not open to the general public. Included in this category is a 200-foot buffer around the outside edge of the sites designated as Illinois Nature Preserves and Land and Water Reserves.
- Environmental Resource Area (with buffer) Lakes, ponds, rivers, creeks, wetlands, Illinois Natural Area Inventory (INAI) sites, oak woodlands, FEMA 100-year flood hazard areas, and Hydrologic Atlas floods of record. 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. Included in this category is a 200-foot buffer around the outside

edge of the resource areas with the exception of flood hazard areas and floods of record.

The Map also includes the following:

- Isolated ADID Wetland - high quality and functional wetlands and habitats
- Isolated Remnant Oak Woodlands (2011)
- Class III Groundwater Area - a demonstrably unique, irreplaceable source
- Regional Trails

Kane County Planning Cooperative

The Kane County Planning Cooperative is the central core of the 2040 Plan Implementation Strategy. The main mission of the Planning Cooperative is to encourage education and information sharing related to planning and to assist with local planning decisions by providing a local forum for education, analysis, communication, and problem solving while integrating health, transportation and land use planning.

Add Planning Cooperative logo.

The Planning Cooperative was instrumental as part of the process to develop the Kane County 2040 Green Infrastructure Plan. On June 7, 2013 the Planning Cooperative partners met at the new Creek Bend Nature Center to learn about the Green Infrastructure Plan; review the Map and provide input.

Add photo of Creek Bend meeting

Staff gave a presentation about the background, rationale and process of developing the Green Infrastructure Plan. Participants were given a list of possible goals and objectives that coordinate with the Kane County 2040 Plan as discussion points. Maps and comment cards were provided at each table and participants were encouraged to make comments and provide additional information.

The written and map comments were compiled and used to determine the goals and objectives for the Kane County 2040 Green Infrastructure Plan described in the next section. *See Meeting Notes in Appendix 2.*

Goals, Objectives and Actions

The following goals, objectives and actions are intended to address the issues discussed in the Background section of this Plan. The goals reflect the shared values of the citizens of Kane County to maintain and improve quality of life. The objectives are specific statements as a means to achieve the identified goals and as a guide for the actions.

Goal: Kane County will be a leader and role model in the area of green infrastructure within the County and throughout the region.

- Objectives:**
- A. to foster public awareness, education, and support of environmental and open space management.
 - B. to promote review and amendments of zoning, subdivision and landscaping and stormwater ordinances to allow and encourage conservation design development.

- Actions:**
1. Coordinate with the Forest Preserve District, County departments, other local and regional governments and organizations to provide public access, education and volunteer opportunities.
 2. Continue to partner with multiple jurisdictions in order to develop, update, and implement watershed-based plans in Kane County.
 3. Educate residents, employees and visitors of Kane County to green infrastructure strategies at the regional, community, neighborhood and site scales.

Goal: Kane County will protect the local water supply and improve water quality.

- Objectives:**
- A. to promote the importance of a sustainable water supply.
 - B. to promote green infrastructure best management practices in order to capture stormwater for groundwater recharge and protect water quality.

- Actions:**
1. Incorporate the results of the Illinois State Water Survey/Geological Survey Kane County Water Resources Investigations when making development decisions and enhancements to the green infrastructure network.
 2. Reclaim and reuse water conducive to the health of ecosystems, preservation of existing drinking water supplies, and holistic management of our water resources public infrastructure..
 3. Protect water resources through compact, mixed-use and conservation design development.

Goal: Kane County will continue to preserve its natural resources.

Objectives: A. to recognize the importance of climate change mitigation and adaptation.

B. to protect and enhance the Fox River and its tributaries, the backbone of our green infrastructure network and the Kishwaukee River watershed.

- Actions:**
1. Coordinate with local and regional governments and organizations to enhance the green infrastructure network at the regional, community, neighborhood and site scales.
 2. Incorporate data from the Chicago Wilderness Climate Change Task Force to protect and improve biodiversity when implementing green infrastructure strategies.
 3. Develop an oak tree restoration program including a tree preservation ordinance.
 4. Promote Integrated Resource Planning among the stakeholders in Kane County and the region as a way to rationalize the management of our natural resources in a cost-effective and sustainable way.

Goal: Kane County will continue to incorporate multi-modal non-motorized transportation options within the Green Infrastructure system.

Objectives: A. To promote the importance of walkability and bikability as community health objectives.

B. To recognize the importance of encouraging non-motorized modes of transportation as a way to provide clean water and air.

C. To promote connectivity throughout the Green Infrastructure system.

Actions: 1. Coordinate with local and regional governments to include options for non-motorized transportation.

2. Encourage the inclusion of the Green Infrastructure Plan and Map in future planning and implementation of the Kane County Bicycle and Pedestrian Plan and Map.

3. Educate residents and other users of the Green Infrastructure system about the advantages of choosing non-motorized transportation options.

Implementation

The Kane County 2040 Plan recognizes that a successful green infrastructure network requires a strategic planning approach and framework for conservation that includes the following principles:

- green infrastructure should be the framework for conservation and development;
- design and plan green infrastructure *before* development;
- identify and implement green infrastructure linkages;
- green infrastructure functions across multiple jurisdictions and at different scales;
- green infrastructure is grounded in sound science and land use planning theories and practices;
- green infrastructure is a critical public investment; and
- green infrastructure involves diverse stakeholders.

The Kane County 2040 Green Infrastructure Plan establishes the framework for enhancing the green infrastructure network in Kane County. The Plan integrates other planning efforts and encourages coordination across the spectrum from regional to local. Taking this approach allows each initiative to reinforce and enhance the next, resulting in a stronger and more functional network.

Keeping in mind the principles listed above, the following strategies can be used to implement the goals and objectives and execute the actions of the Green Infrastructure Plan:

- **Acquisition by public agencies**

Open space and natural area acquisition by public agencies has proven successful by the Forest Preserve District, Campton and Dundee Townships, and a number of local park districts and departments. The several referenda passed in recent years indicate the value residents place on protecting the natural resources of the County. The Green Infrastructure Map will provide guidance for future acquisitions and opportunities for partnerships to leverage funding and encourage connectivity.

- **Conservation easements on private land**

Privately owned natural areas and open spaces can be voluntarily dedicated for long-term protection under a conservation easement. The areas within the easement remain in private ownership, but the rights to control the use are held

by an organization whose mission is the protection of open space. Currently there are conservation easements in Kane County held by the Conservation Foundation, a non-profit land and watershed protection organization and Campton Township.

Private land owners may also protect their land through the Illinois Nature Preserves Commission (INPC). Land dedicated as an Illinois Nature Preserve or registered as an Illinois Land and Water Reserve has been recognized for its high ecological value and is afforded the highest level of land protection in Illinois. The landowner retains title to the property without providing public access. The Green Infrastructure Plan and Map can assist private landowners in determining the importance of protecting their land either through an easement or the INPC.

- **Land Use Planning and Zoning**

Land use and development decisions are essential to protecting and enhancing the open space armature and greenway system that makes up the green infrastructure in Kane County. The core layers on the *Green Infrastructure Map in Appendix 8* as well as the additional *Water Resource Elements in Appendix 5* provide valuable guidance for making those important decisions.

Planning recommends and zoning regulates. Zoning, subdivision, landscape and stormwater ordinances should be consistent with the land use plan in protecting the natural resources of the County. Local governments will benefit from the information provided in this Plan and Map when updating their land use plans, and reviewing ordinances and developments for consistency.

- **Conservation Development**

A type of development available to local governments in Kane County that protects a variety of ecological resources and services such as biodiversity, productive farmland, ecosystem services, scenic landscapes and historic and cultural resources is conservation development. Conservation development uses creative site planning techniques to protect the area's water and natural resources.

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. 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 increased volume of stormwater runoff and degradation of runoff quality. Low impact development (LID) designs feature narrower streets, permeable paving, and stormwater best management practices such as bio-swales 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.

Considering that many of the sensitive lands mapped in the Kane County green infrastructure network are not publicly protected, and are within the planning and zoning jurisdictions of local governments, 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.

In order to create a more livable and sustainable community, the Village of Algonquin has committed to preserving the integrity of its natural resources and to providing long-term ecological management. The Village adopted Conservation Design Standards and Procedures based on the approach developed by McHenry County. These new development regulations for projects of one acre or larger that contain or abut sensitive natural resource areas, encourage infill development and redevelopment and requires developers and consultants to work with the natural resources by developing around these features rather than destroying or damaging them. Developers can voluntarily apply as a conservation development and can receive density bonuses if they propose a

design that incorporates environmentally sensitive features that exceed the minimum requirements of the Ordinance. The Cities of Woodstock and Crystal Lake have adopted similar ordinances.

Local governments can use the information in this Plan when updating their land use plans and zoning ordinances to determine where conservation development might be appropriate. *See Ordinance Checklist for Municipalities in Appendix 6.*

- **Links or Greenway Connections**

As discussed in the Background section, links or greenways connect the hubs and tie the system together, enabling the green infrastructure network to function. They can provide connectivity between adjacent areas, provide buffers for linear features such as streams, and can serve as corridors for recreational trails. Local governments have the opportunity to use the Green Infrastructure Plan as a guide to making important connections and when appropriate partner with other entities.

- **Trails, Bikeways and Water Trails**

Trails, bikeways and water trails are an excellent opportunity to promote exercise and healthy living as well as provide alternative transportation connections between communities, schools, jobs and commercial centers, thereby reducing highway congestion. The Kane County bicycle/pedestrian system and the Northeastern Illinois Water Trails system provide this opportunity and can be used with the Green Infrastructure Map to expand the systems where appropriate.

- **Landscape Retrofits and Restoration**

Significant green infrastructure opportunities may exist in and/or adjacent to already developed land. Numerous examples of retrofitted landscapes can be found where turf grass or riprap edges in and around stormwater detention basins have been replaced with native vegetation; and invasive brush and weeds along streams have been replaced with native riparian vegetation. Rain gardens and bio-swales can be installed adjacent to wetlands, lakes and streams.

Restoration opportunities may include drained wetlands, remnant oak woodlands and prairies currently used for agricultural purposes. Removal of subsurface drainage tiles and regrading of drainage ditches have improved hydrology and restored native vegetation and wildlife. The benefits include the storage and

cleansing of stormwater. Restoration of remnant oak woodlands improve the biodiversity and habitat of the area as well as offer climate change mitigation and adaptation. Educating local decision-makers about retrofit opportunities can result in an improved green infrastructure network.

- **Farmland Protection**

In 2011 Kane County celebrated the 10th anniversary of the Farmland Protection Program which has permanently protected over 5000 acres of prime farmland in 30 family owned farms. The Farmland Protection Program in conjunction with the Protected Agriculture-Limited Development land use category described in the Background section encourages linkages to the open space network; and the use of best management practices for soil and water conservation and protection. Both can enhance and strengthen the green infrastructure network.

- **Neighborhood and Site Best Management Practices**

Green infrastructure best management practices (BMPs) implemented at the local level can provide water quality, flood reduction, groundwater recharge and local habitat benefits. Even though these BMPs are realized on a small scale, they are important elements and links to community and regional issues:

- Permeable paving to allow infiltration of stormwater
- Green roofs to retain and slow stormwater
- Rain barrels collect and store stormwater for onsite use
- Bioswales and rain gardens filter, cool and cleanse stormwater
- Natural landscaping to compliment detention basins, filter strips, bioswales and rain gardens
- Naturalized detention basins to improve water quality and provide habitat benefits
- Reuse of gray water to irrigate plants and to reduce dependence on drinking water supplies.

Education of residents and property owners is important in order to encourage the above activities.

Kane County Planning Cooperative

The Kane County Planning Cooperative will continue to be instrumental in the implementation of the Green Infrastructure Plan. The Planning Cooperative provides the opportunity for participation in educational and networking opportunities described in the Actions for all three of the Goals.

Funding is a major part of any green infrastructure project and increasingly funders are looking for partnerships and collaborations that are tied to an adopted plan. One of the goals of the Planning Cooperative is to facilitate the formation of partnerships for grant applications, increasing opportunities for success.

Planning Workshops

Kane County began hosting the workshop series “Making It Work!” in 1999 to educate County and municipal decision makers. Since then, the County has hosted 11 workshops in three series. Future workshops may provide the opportunity for education on the benefits of green infrastructure.

As part of the resources available to implementers, a web page devoted to the Green Infrastructure Plan will include an interactive map. Users can choose which layers would be most beneficial to their project. Additional supporting layers not included on the final version of the Map will also be available.

The success or failure of any plan depends on its relevancy and effort at implementation. Kane County understands the importance of periodic review of the Green Infrastructure Plan and recommends a review of this document in 2018 to analyze current science, theory and practice and the level of implementation.

Appendix 1

Strategic Conservation Makes Economic Sense – Local Green Infrastructure Case Studies

Green infrastructure development can save both private developers and public agencies money in many different ways. Green infrastructure can reduce initial land acquisition costs, infrastructure material costs and ongoing maintenance costs. Additionally, green infrastructure provides many types of indirect cost savings through reducing expenses related to water treatment, flood damage, the heating and cooling of buildings, habitat restoration and healthcare.

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An economic breakdown of costs for green versus grey infrastructure will allow officials to justify their investments in green infrastructure projects. The concept of saving money through green infrastructure is not new. Here are some examples of how green infrastructure approaches have benefitted developers and governmental agencies in our area.

The Blackberry Creek Watershed Alternative Futures Fiscal Study

This study conducted in 2004 by the Northern Illinois Center for Governmental Studies compared the fiscal impacts of conventional “grey” infrastructure versus environmental sensitive “green” infrastructure.” The hypothesis in this study proposed that there was a positive relationship between environmentally sensitive and fiscally responsible land development. To support this hypothesis, the study analyzed the fiscal impacts of planned development within the Blackberry Creek Watershed under two alternative development scenarios, Conventional and Conservation.

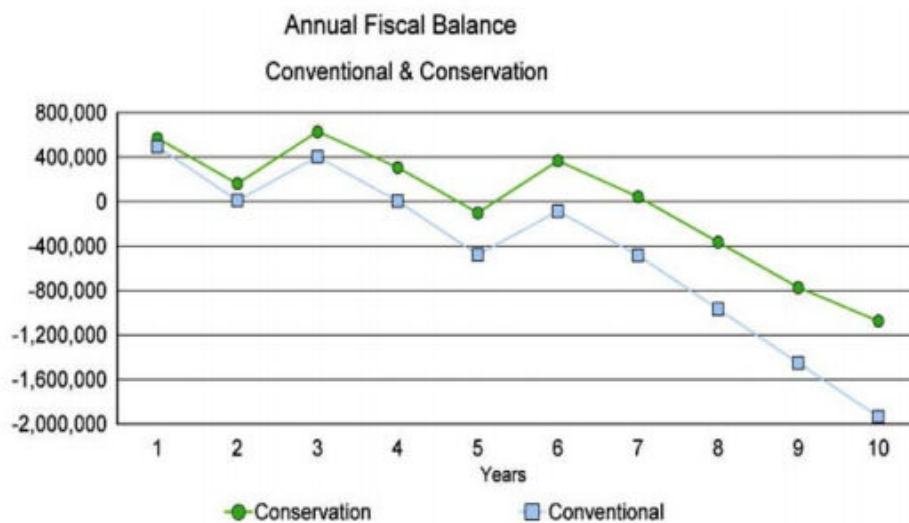
These development scenarios were carried out within a study area that was comprised of the unincorporated and undeveloped portions of the Blackberry Creek Watershed that were also located in the planning areas of municipalities. The planning areas that were used included portions of: Aurora, Batavia, Elburn, Montgomery, North Aurora, Sugar Grove and Yorkville.

A fiscal impact analysis projecting overall revenues and expenditures likely to occur over a 10 year period was conducted. The projected costs of implementing conventional infrastructure included relatively larger lot sizes, regular sized rights of way, standard stormwater controls as well as standard public water, sanitary

sewer, storm sewers, sidewalks, curbs, gutters and standard street widths.¹ The projected costs of implementing conservative, “green”, infrastructure included relatively smaller lot sizes and the conservation scenario represents a form of development in which the pattern is flexible with the topography and natural drainage patterns. This pattern creates a more condensed development pattern leaving a greater percentage of the land in natural areas. Infrastructure is minimal with reduced rights-of-way and street widths, and the use of natural land features that support storm water control. The “clustering” of residential dwelling units is an important feature of the “green” scenario.¹

The findings show that the Conservation Development imposes a lower public cost. Figure 1 below represents these cost savings over time. These cost savings are due to lower future costs of infrastructure maintenance and replacement. Communities today typically have land use plans and development regulations that promote conventionally designed spaces. However, this study showed that through conservatively designed “green” infrastructure there can be reduced costs to municipalities and these savings may be able to be reflected by lower tax rates for citizens.

Figure 1 – Municipalities Annual Fiscal Balance Conventional & Conservation



Blackberry Creek Watershed Alternative Futures Fiscal Impact Study (2004)

¹ Blackberry Creek Watershed Alternative Futures Fiscal Impact Study (2004)

Conventional vs. Conservation Development – Mill Creek vs. Sunset Prairie

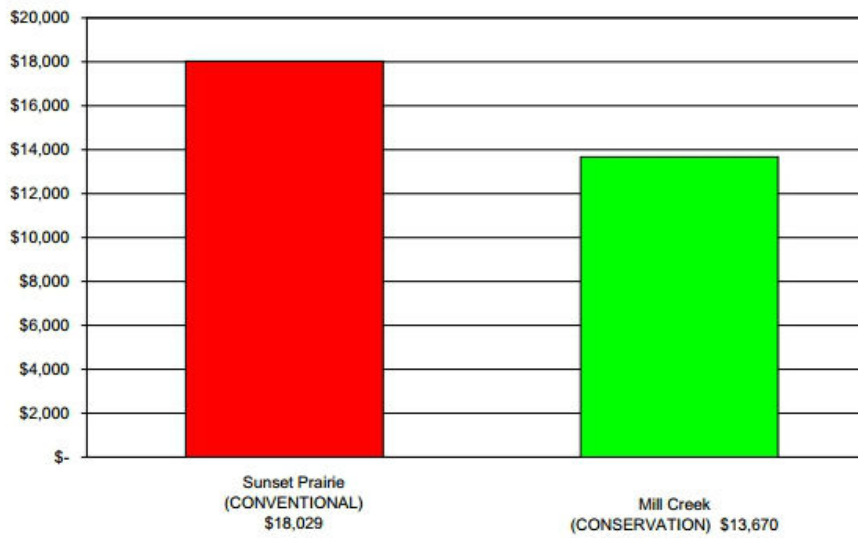
To address flooding, water quality, open space protection and urban sprawl, the Kane County 2020 Land Resource Management Plan, along with several watershed plans, were developed. Mill Creek is a subdivision in unincorporated Kane County that is approximately five miles west of Geneva and Batavia. It is a large-scale planned community with large areas of contiguous open space, a wide range of housing types, neighborhood retail centers and recreational amenities. This community embodies many of the conservation planning principles outlined in the county's Land Resource Management Plan. The Sunset Prairie community is also approximately five miles west of downtown Geneva within the City and is a typical single family subdivision for many areas in Kane County that are within the corporate limits of municipalities.

Similarly dense portions of these neighborhoods were compared. A cost analysis was generated from probable construction costs. Based on per-lot cost results, it was found that approximately \$3,700 per lot is saved in the conservation "green" development relative to the conventional development approach.²

Approximately 53% of the savings came from stormwater management construction costs and 21% came from site preparation costs.² Figure 2 below illustrates the total cost-per-lot comparison between the two different subdivisions. Figure 3 shows the cost breakdowns for each aspect of lot development. Figure 4 shows the percentage of savings for each aspect of conservation development in comparison to conventional development.

² Changing Cost Perceptions (2005)

Figure 2 – Total Cost-Per-Lot Comparison – Mill Creek vs. Sunset Prairie
TOTAL COST PER LOT COMPARISON



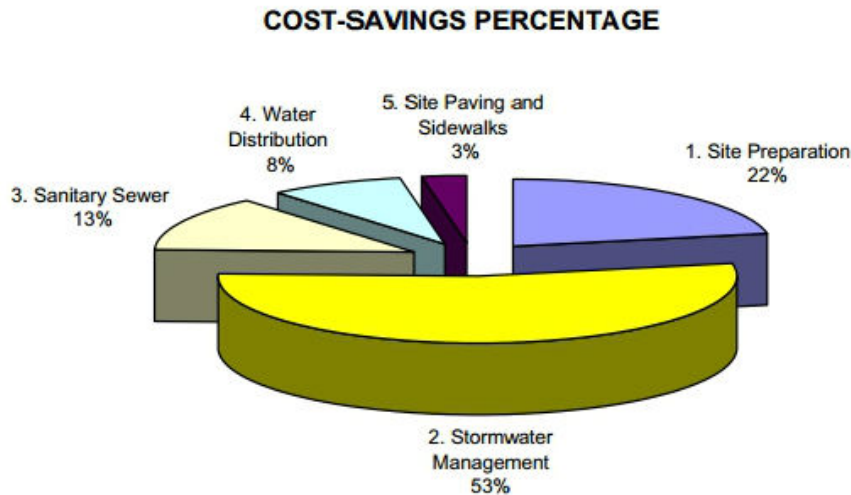
Changing Cost Perceptions (2005)

Figure 3 – Cost Breakdown for Each Aspect of Lot Development – Mill Creek vs. Sunset Prairie



Changing Cost Perceptions (2005)

Figure 4 – Percentage of Savings for Each Aspect of Lot Development – Mill Creek vs. Sunset Prairie



Changing Cost Perceptions (2005)

Green Infrastructure in Chicago

The City of Chicago has been a leader in implementing green infrastructure. Chicago’s existing green infrastructure includes green alleys, rooftop gardens, street trees and open space / parkland. Chicago’s green alleys and rooftop gardens diverted approximately 70 million gallons of water from treatment facilities in 2009, thus saving the city money.³ Chicago’s Green Alley Program, which includes permeable paving, downspout disconnections, rain barrels and tree planting, is 3 to 6 times more effective in managing stormwater per \$1,000 invested than conventional methods.⁴ It was also found that if the city had green roofs on 10% of their rooftops; 17,400 Mg of Nitrogen Dioxide would be removed annually, resulting in avoided public health costs of between \$29.2 million and \$111 million a year.⁵

Sustainable Corporate Campus – Caterpillar Inc.

Caterpillar Incorporated hired Pizzo and Associates for an ecological restoration project on their corporate campus in East Peoria, IL. The 25 acre campus had acreages of turf grass lots and scattered brownfield sites. With a \$190,000 budget

³ Green Infrastructure Could Save Cities Billions
⁴ The Value of Green Infrastructure for Urban Climate Adaptation
⁵ Banking on Green

Pizzo and Associates restored the corporate campus using green infrastructure best management practices. In 2008 Pizzo and Associates began implementing a phased ecological restoration plan that would realize Caterpillar’s sustainability vision, lower campus maintenance costs, minimize the use of water and remediate campus brownfields. The restoration began by converting existing turf grass to native prairie, installing buffalo grass along roads and rights-of-way and replacing all high maintenance landscaping with low maintenance native landscaping. The parts of the property that were considered brownfields were converted to native prairie using special soil and compost supplements. In just two years, maintenance costs had been reduced by \$1,600 per acre. Over the 25 acre property, this is a \$40,000 reduction in maintenance costs over two years. Over time, this number should increase providing Caterpillar with even more savings due to reductions in water use and maintenance costs.



Cost Reductions from Conservation Design Best Management Practices
Landscaping

Detailed cost information for both conventional and conservation landscaping is available for the Midwest. The Conservation Design Forum compared the installation costs for 10 acres of corporate landscape with both conventional turf-based landscaping and native landscaping. The comparison looked at specific labor, materials, monitoring and design costs. The tables below illustrate this comparison. Figure 5 shows how the up-front installation costs differ between sustainable and traditional landscapes.

Figure 5 – Installation Costs for Native vs. Turf Landscapes at Ten-acre Corporate Campus

	Sustainable (Native)	Traditional (Turf)	Note
Up-Front Installation	\$141,000*	269,000	The difference is mostly in direct construction costs that include grading, irrigation system, etc.

Changing Cost Perceptions (2005)

To gain an understanding of how turf-grass and native landscape investments fare over the course of a year, cost ranges were developed and compared. Figure 6 below shows the cost comparison.

Figure 6 – Year One Installation Costs for Native vs. Turf Landscapes

Year 1 Dollar Costs Per Acre*			
Landscape Treatment	Low End Estimate	High End Estimate	Note
Turf Grass	\$7,800	\$14,825	Depends upon 1 st year maintenance assumptions
Native Landscaping	\$3,400	\$5,975	Depends upon use of seed versus plugs, & 1st year maintenance assumptions
Difference (Savings from Native Landscaping)	\$4,400	\$8,850	

Changing Cost Perceptions (2005) - Conservation Design Forum, Applied Ecological Services, Pizzo & Associates, through the Northeastern Illinois Planning Commission

Additional cost reduction benefits for landscaping best management practices are realized over time. Figure 7 below illustrates the cost differences between conventional turf grass landscaping and native landscaping over a 10 year period.

Figure 7 – Total Long-term Maintenance Costs for Native vs. Turf Landscapes

	Sustainable (Native)	Traditional (Turf)	Note
Ten Years Maintenance Total	162,000	315,000	Native is slightly less in first 5 years. Significantly less thereafter, as site is more established. The only significant long-term management expense is annual burning.

Changing Cost Perceptions (2005) - Conservation Design Forum, Applied Ecological Services, Pizzo & Associates, through the Northeastern Illinois Planning Commission

Figure 8 breaks down the 10-year maintenance costs by providing estimated yearly cost ranges per acre. The table illustrates the cost effectiveness of implementing native landscapes.

Figure 8 – Ten-year Maintenance Costs for Native vs. Turf Landscapes

10 Year Average Maintenance Cost per Acre*		
Landscape Treatment	Low End Estimate	High End Estimate
Turf Grass	\$5,550	\$6,471
Native Landscaping	\$1,600	\$1,788
Difference (Savings from Native Landscaping)	\$3,950	\$4,683

Changing Cost Perceptions (2005) - Conservation Design Forum Applied Ecological Services, Pizzo & Associates, through the Northeastern Illinois Planning Commission

Streets and Parking

Although impervious surfaces are a necessary part of most developments, conservation best management practices can minimize the impervious surface areas of streets, sidewalks and parking lots through better site design or through the use of alternative materials.

Design and Layout

Several conservation methods can decrease the square footage of needed pavement by reducing the size or amount of streets, sidewalks or parking lots, thereby dramatically reducing cost regardless of materials used. These strategies would include relatively smaller lot sizes, smaller rights-of-way and conservatively designed land that would reduce the need for curbs, gutters and storm drain pipes.

The conventional cost to treat an acre of impervious surface runoff for both quality and quantity can range from \$30,000 to \$50,000.² Therefore, by reducing impervious surface area, through clustering, or reducing street, sidewalk or parking lot size, reductions in stormwater conveyance and treatment can be realized.

In addition to cost reductions in stormwater treatment, design layout best management practices have been shown to save money directly through the reduction in infrastructure. A study conducted by Dennis Dreher and Tom Price (1997) describe some of the cost savings from decreasing the lengths and widths of streets, driveways and sidewalks. They show that if the width of a typical

² Changing Cost Perceptions (2005)

residential street installation is reduced from 34 feet to 26 feet, the cost savings would be \$94,000 per mile.⁶ The savings from constructing a smaller parking lot can also be compelling. The cost of a single parking space can be up to \$1,100.⁶ Therefore the reduction in parking spaces lead to savings. When impervious cover is reduced by layout design, everyone involved can save money. These savings are realized through land acquisition costs, infrastructure material costs and reductions in stormwater runoff.

Materials

Conventional surfacing materials for roads and parking lots typically include asphalt or concrete. The conservation alternative to concrete and asphalt includes a range of porous pavement products which contribute to on-site water management. Figure 9 shows the comparison of surface material costs. The table shows that asphalt is significantly cheaper per square foot than porous materials.

Figure 9 – Material Installation Costs Per Square Foot

Paving System	Installation costs per square foot (quotes from suppliers)
Asphalt	\$0.50 - \$1.00
Porous concrete	\$2.00 - \$6.50
Grass/gravel pavers	\$1.50 - \$5.75
Interlocking concrete paving blocks	\$5.00 - \$10.00

Changing Cost Perceptions (2005) - Low Impact Development Center, 2002

However, permeable paving can cut expenses elsewhere on a project. In cases where porous paving is used, the size of required stormwater detention facilities can be decreased. Therefore, a smaller basin can be built, which preserves more land for other uses. Likewise, conveyance costs can be reduced, which can help offset the cost of porous paving material choices further. Permeable paving will be able to reduce or even eliminate the need for underground storm drain pipes.² A study conducted by the Low-Impact Development Center showed that although porous asphalt costs approximately 10% more than non-porous material, it can reduce overall costs by as much as 30%. These savings are demonstrated in Figure 10. Figure 10 outlines the costs for conventional vs. conservative infrastructure materials when all infrastructure related costs are included.

⁶ Reducing the Impacts of Urban Runoff (1997)

² Changing Cost Perceptions (2005)

Figure 10 – Material Installation Cost Per Square Foot With All Infrastructure Costs Considered

Paving System	Installation costs per square foot (quotes from suppliers)
A permeable paver stormwater management system (including drains, reinforced concrete pipes, catch basins, outfalls, storm sewer connections)*	\$4.50 – 6.50
A conventional concrete stormwater management system. (including drains, reinforced concrete pipes, catch basins, outfalls, storm sewer connections)	\$9.50-11.50

Changing Cost Perceptions (2005) - Low Impact Development Center, 2002
Water Conveyance Costs

An additional cost factor is the longer life span of many permeable paving systems. As a consequence, permeable paving materials may have lower life-cycle costs.

As stormwater is being conveyed off-site, cost reductions can be realized through the use of swales instead of the conventional curb, gutter and storm water pipe. The term swale refers to a series of vegetated, open channels that are designed specifically to decrease and treat stormwater. Estimates from the EPA show seeded swales cost approximately \$6.50 per linear foot, while sodded swales average \$20.00 per linear foot.² These costs include mobilization, site preparation, development, inlet and outlet structures, design, legal costs and contingencies. Alternatively, a conventional structural conveyance system which includes curb, gutters and storm drain inlet and outlet pipes costs between \$40 and \$50 per linear foot. This is 2 to 3 times more expensive than grass swales.² Swales may not always make sense on dense urban land due to relatively high land prices. However, if swales can be properly sited and designed they can have large economic payoffs.

Appendix 2 Meeting Notes

Kane County 2040 Green Infrastructure Plan

Notes from 8/16/12 Natural Resource Advisors Meeting

- Revise the list of GI purposes. Emphasize water resources as top priorities. Compare to Kane Co. 2040 Plan priorities and updates as appropriate (e.g., re. community/family health).
- Check INAI – is this the most current mapping. Coordinate with Steve Byers to check.
- Obtain Fox River Watershed Biodiversity Inventory. The inventory is available at: <http://www.chicagowilderness.org/index.php/what-we-do/protecting-green-infrastructure/epdd-resources/biodiversity-and-natural-habitats/fox-river-watershed-diversity-inventory/> . It is primarily a mapping of sensitive sites (primarily INAI) and stream corridors, marked on USGS quad maps. I didn't find a composite map, but I recommend that we be prepared to show some overlays of the FRWBI sites/corridors on top of our core GIS mapping at our October advisors meeting. I'm guessing that we already have pretty much everything contained in this inventory.
- Stream quality mapping: The suggestion was to obtain and map stream quality ratings (presumably IBI). May need to check with IDNR (Bob Rung?) or IEPA to get current data/mapping. It would likely be too "busy" to include this on our core GI map, but it could be useful as a background/supporting map in our report.
- There was a question of whether the 2040 open space map layer includes golf courses, private and public. There seemed to be support for retaining private courses if they're supportive of our GI principles. Should plan further discussion at the next meeting re. how this is addressed with mapping "rules".
- Water supply planning: We should address/include relevant water supply/recharge mapping in the GI plan. But, at the same time, not duplicate everything in Kane County's water supply initiative. Presumably, this can be sorted out via discussions among county departments.
- Hydric soils: Check mapping w/Candace at SWCD to make sure we're mapping "true" hydrics and not hydric inclusions.
- Farmed wetlands: Follow up w/NRCS about the possibility of using the farmed wetland inventory as was done in McHenry County. If nothing else, we may be able to use it for "planning" purposes but not include actual designations on the final map. In addition to checking with Candace, could also check with Spring Duffey at McHenry SWCD/NRCS.

- It was recommended that we extend the base mapping, wherever possible, into adjacent counties. This is important, mainly to recognize that resources don't stop at political boundaries and to highlight possible corridor extensions in to neighboring jurisdictions, and the possibility for "regional" GI conservation. In the McHenry GI project, we extended the working maps and final maps approx. ½ mile into neighboring counties.
- T&E species locations: As the mapping evolves, it may be preferable to show T&E locations as points on the map vs. polygons so they don't obscure other map layers.
- Map background: As we move to larger maps for our workshop, we should probably plan to use screened aerials as the background mapping (vs. a white background). That will help us and our advisors know the land use underlying the GI layers (i.e., are they developed or not).
- Map layering: We should try out some alternative layering schemes on the maps. For example, INAI site shouldn't obscure public open space. The approach that was generally used in McHenry County was to have "protected" uses always appear and not be obscured. The first priority was public open space; the next was private protects (e.g., conservation easements and INPC sites), as I recall. But, we also used some shading "tricks" so we could decipher when wetlands/floodplains/woods were in Conservation District ownership. My suggestion is to contact Darrell Moore, McHenry County planner, who did the mapping for that project so we don't have to reinvent the wheel.

Kane County 2040 Green Infrastructure Plan

Notes from 1/29/13 Natural Resource Advisors Meeting

- Make sure we have the latest info. INAI from IDNR. (Dennis will follow up with Nancy/IDNR.)
- Group agreed to include the fen recharge data in the core Green Infrastructure Map in the next update.
- Discuss the supporting layers in the report but not in the core map.
- Group agreed on mapping a 200' buffer and then making adjustments at the Workshop.
 - Similar to the McHenry County protocol, the buffer will be applied to the following map layers: water, wetlands, remnant oak woodlands, INAI sites, INPC nature preserves, Kane County Forest Preserves, and regional trails.
 - Drew mentioned the green corridors ID'ed in the Kane County 2020 and 2030 Plans and that 200' should be the minimum buffer.
 - The report should discuss the application of a 200' buffer from a planning and policy perspective.
- KC Board Member TR Smith noted the absence of buffers and the elimination of fence rows over the years has resulted in the minimization/elimination of habitat, most notably the pheasant.
- Group agreed on a minimum of 50 acres for isolated polygons.
- Ask Ken Anderson to help Tim ID organic soils.
- Group agreed to add Class III special resource ground water protection boundaries (as relating to Trout Park) as an overlay. Check for existence of any other Class IIIs.
- Group agreed to amend the Flood-of-Record maps that may date back to the 1920s to ID where urbanization may have altered/eliminated floodplain and depressional storage areas.
- Agreed on attempt to schedule the Workshop for the first week in March.
- Should we include utility corridors?
 - Tim will determine if that info. is available.
 - Dennis will discuss with Sarah Race from ComEd
- Paul Schuch suggested we consider adding the following info or at least discuss in the report: *Do we need to discuss further?*
 - IEPA wellhead protection/well capture zones.
 - shallow aquifer map as part of the supporting map
 - ISGS surficial outcroppings (earthen materials)
 - Leaking Underground Storage Tank Sites (LUST sites)
 - IEPA/USEPA groundwater contamination sites
 - natural floodplain terraces (Dennis suggested these might show up on other maps)
- Mary O. suggested we ID unique geological features, such as kames and eskers.
- Drew and others agreed that we limit the amount of info. included on the core map. (I.e., map "supporting" green infrastructure on separate maps to avoid confusion.)

- Sue Harney suggested we include Superfund Sites.
- Add regional trails ID'ed in the Kane County Bicycle/Pedestrian Plan/Map.
- Drew is aware of two fens to be added.
- Drew suggested we agree on a minimum size for woodlands, wetlands...that are worth spending resources on to restore/enhance.
- Should we include scout camps?
- Dan Lobbes asked that we pay close attention to the mapping and preservation of open space around Fermi Lab, especially as it relates to long-term land use issues and development pressures.

Kane County 2040 Green Infrastructure Plan

Notes from 3/8/13 Mapping Workshop

Participants:

- Seth Crackel, Pizzo Assoc.
- Mike Ander
- Jane Holley, Lake Campton Home Owners Association
- Mary Ochsenschlager
- Drew Ullberg, Forest Preserve District of KC
- Steven Byers, IL Nature Preserves Commission
- Sue Harney, Dundee Township
- Hamid Ahmed, KC Dev. Dept.
- Corrine Nogajewski, KC Dev. Dept.
- Pam Petoskey, KC GIS Dept.
- Ben Haberthur, Forest Preserve Dist. of KC
- Matt Bardol, Geosyntec
- Nancy Williamson, IDNR
- Dennis Dreher, Geosyntec
- Tim Mescher, KC Dev. Dept.
- Karen Ann Miller, KC Dev. Dept.

The project team presented an overview of the concepts of core and supporting green infrastructure (GI). The various map layers that are part of core GI were highlighted and the previously identified mapping rules were reviewed. After reviewing the map, the participants engaged in a process mark up the maps to:

6. Add any missing resources, such as newly protected public open spaces.
7. Remove any mapped resources that do not meet the definition of green infrastructure. For example, if a flood-of-record is in an area that has been subsequently urbanized, resulting in the elimination of a watercourse or its apparent capture in a storm sewer, it should be eliminated from the map.
8. Make connections to adjacent GI resource areas to establish connectivity. If adjacent resource areas are within 200 feet, a connection (or corridor) was identified between the resources. Professional judgment was used to sometimes extend the connection distance.
9. Aggregate isolated resource polygons into larger, functional systems. Notably, areas of potential organic soils were identified for addition to the core GI map where they enabled connections between adjacent wetlands and/or provide opportunities for strategic, large-scale wetland restoration.

The suggested changes/additions were manually marked up on the map and a township and number was recorded for each. Correspondingly, explanatory notes were recorded for each mark-up.

In addition to the individual changes that were recommended, a few generalized follow-up tasks also were identified.

- A number of schools or other institutional properties were identified to be part of public or private open space mapping, even though they were largely impervious in nature. These sites, or appropriate high impervious portions of them, should be systematically removed from the core GI mapping.
- A few possible conservation easements (i.e., with TCF) were noted as not being mapped. We should get the latest TLC easement/ownership mapping and update our map as appropriate. (I checked with Dan Lobbes and he indicated he could provide updated mapping. We should follow up with him.)
- We need to develop an overlay map of organic soils and wetlands to identify areas of possible wetland aggregation. (This is probably best done digitally.) In some cases, the organic soil mapping will result in the aggregation of isolated wetlands with floodplains and associated remnant woodlands and other habitat areas.

After all of the changes/additions are made, we will run a screen of isolated complexes of less than 50 acres. These smaller isolated resources will not be included in the aggregated “green” mapping on the final map, but will be retained with appropriate symbology (e.g., wetlands and woodlands).

Kane County 2040 Green Infrastructure Plan

Meeting Notes from 6/7/13 Planning Cooperative Meeting Creek Bend Nature Center

The Kane County Green Infrastructure Plan was the focus of the quarterly Kane County Planning Cooperative meeting on Friday, June 7, 2013 at the newly opened Creek Bend Nature Center, part of LeRoy Oakes Forest Preserve in St. Charles. The purpose of the Planning Cooperative is to serve as the central core of the Kane County 2040 Plan implementation by filling gaps in local planning resources. Partners include all agencies involved in planning in the County and meetings are open to elected and appointed officials, planning commission members, staff and private sector planners. Because the main topic of this meeting was to discuss the Kane County Green Infrastructure Plan, the Natural Resources Advisers, who were instrumental in the development of the Green Infrastructure Map, were also invited to participate.

The following individuals attended the June 7th meeting:

1. Bonnie Hanson, Hampshire Chamber of Commerce
2. George Brust, Hampshire Village Board
3. Ed Ritter, Carpentersville Village President
4. Jay Rients, Ecology and Vision
5. Jerry Dickson, KC Dept. of Transportation
6. Michele Springer, Forest Preserve District of Kane County
7. Jamie Ludovic, Village Montgomery
8. Dan Lobbes, The Conservation Foundation
9. Jeaneen Bennett, Village of Burlington
10. Gary Swick, Friends of the Fox River
11. Jack Shouba, Campton Township
12. Jan Sorenson, Natural Resources Advisers
13. Nancy Williamson, Il Dept. of Natural Resources
14. Jerad Chipman, Village of Montgomery
15. Maggie Soliz, Kane-DuPage Soil and Water Conservation District
16. William Graser, Forest Preserve District of Kane County
17. Marc McLaughlin, Village of South Elgin
18. Phil Bus, Consultant/Citizen
19. Jim Cooke, St. Charles Park District
20. Lucy Theler Atoe, City of Batavia
21. Russ Farnum, Village of Algonquin
22. Rob Linke, Trotter and Associates
23. Ben Haberthur, Forest Preserve District of Kane County
24. Colleen Zumpf, Forest Preserve District of Kane County
25. Dennis Dreher, Geosyntec
26. Mark VanKerkhoff, Kane County Development and Community Services Dept.
27. Tim Mescher, Kane County Development and Community Services Dept.
28. Brett Hanlon, Kane County Development and Community Services Dept.

29. Ellen Johnson, Kane County Development and Community Services Dept.
30. Karen Ann Miller, Kane County Development and Community Services Dept.

The meeting opened with a welcome by Mark VanKerkhoff and presentation on the Kane County 2040 Plan and Planning Cooperative.

Michele Springer from the Forest Preserve District of Kane County gave a history and description of LeRoy Oakes Forest Preserve and the former estate home and current Creek Bend Nature Center. After the meeting participants were offered a tour of the building by the Forest Preserve.

Rob Linke from Trotter and Associates and member of a team involved with the restoration and dam removal of Ferson Creek located in the LeRoy Oakes Forest Preserve described the background and process of this project. After the meeting Rob offered a tour of the project site.

Dennis Dreher, Nancy Williamson and Karen Miller presented information on green infrastructure, the Chicago Wilderness Green Infrastructure Vision, the SWAT, and Kane County's Green Infrastructure Plan and how it fits in with Kane County planning. A list of possible policies and objectives to consider for inclusion in the Report was provided (attached). These coordinate with policies and objectives in the Kane County 2040 Plan adopted by the Kane County Board last year. The draft Green Infrastructure Map was unveiled and participants were asked to provide comments on the map and/or on comment forms provided on each table. A summary of those comments is also attached.

During the presentation, discussion from the participants was encouraged. Following is a list of the topics discussed by participants:

- Over 20 million square feet of permeable pavers have been installed in Kane County.
- The Village of Campton Hills has been working on a Green Infrastructure Ordinance following the adoption of their Green Infrastructure Plan.
- It might be helpful to provide cost examples of conventional vs green infrastructure methods.
- It seems the popularity of living near open space is increasing; look for data.
- The Villages of Hampshire and Burlington are interested in working with Kane County to build a golf course south of the forest preserve.
- The Remnant Oak Woodlands Map includes areas in private ownership. Education for residents and homeowners associations should be considered.
- Let's implement the Plan!
- The Village of Montgomery has had success with public acceptance of naturalized detention ponds over years.
- The Village of Montgomery offered to work with the City of Batavia on the issue of naturalized detention basins.
- It would be helpful to develop model ordinances to implement the Plan.

Possible Policies and Objectives

- ▶ Implement 2040 Conceptual Land Use Strategy
 - ▶ Coordinate with regional/local efforts
 - ▶ Chicago Wilderness Green Infrastructure Vision
 - ▶ CMAP GO TO 2040 Plan
 - ▶ Forest Preserve
 - ▶ Townships
 - ▶ Park Districts
 - ▶ Municipalities
 - ▶ Encourage non-acquisition techniques:
 - ▶ Conservation easements
 - ▶ Tax adjustments/incentives
 - ▶ Dedication
 - ▶ Consider feasibility of further acquisition by public agencies
 - ▶ Referenda
 - ▶ Incorporate conservation and sustainability in ordinances
 - ▶ Tree Preservation Ordinance
 - ▶ Conservation Design Ordinance
 - ▶ Provide functional greenway connections
 - ▶ Expand the countywide bicycle/pedestrian network
 - ▶ Restore Kane County's unique and fragile environment
 - ▶ Protect farmland as a valuable natural resource
-



Kane County Green Infrastructure Plan – Written Comments

- Failed restoration projects prevent people accepting native projects. Insist that criteria for stewardship be very strict.
- Cost comparisons (between conventional infrastructure development and green infrastructure development).
- Hampshire and Burlington would like consideration for an 18-hole golf course to be developed at the Hampshire South Forest Preserve. This would comply with all of the goals presented including getting kids outside (with the 1st tee program). We have established walking trail/bike path requirements that can easily be tied into the property as the area develops. – George Brust, Hampshire Village Trustee
- The Village of Burlington with the Village of Hampshire would like consideration of an 18-hole golf course at the Hampshire South Forest Preserve. As the area develops, this would help preserve the green space and tie the communities together with bike and walking paths. – Jeaneen Bennett, Village Clerk, Village of Burlington
- The Villages of Hampshire and Burlington would like consideration for an 18-hole golf course to be developed at the Hampshire South Forest Preserve. We have established walking trail/bike path requirements that can easily be tied into the property as the area continues to develop. – Bonnie K. Hanson, Hampshire Chamber of Commerce
- Check to see if Winchester Glen’s (a subdivision in Carpentersville) preserve is mapped as privately protected open space (it has a conservation easement). The Alternative Futures Study – from Blackberry Creek Watershed (published in 2000) costs for developers and costs for municipalities.
- What can / should we do about invasive species, primarily softwood and Reed Canary grass type of materials, in our environment?
- Identify / name all “red” “named” pedestrian paths IE. Gilman Trail etc.
- Property acquisition policies must consider local comprehensive plans / community input.
- Consider regional public education / marketing about conservation design, green infrastructure and open space.
- Kane County tax incentives or impact fee adjustments to encourage sustainable design.

- Local assistance for implementation and public education about conservation design ordinances.
- At the Fine Scale, can info from IDNR EOR's be used to enhance the protection (acquisition-priority & buffer size) of significant wetlands? This would better protect species like the Blandings Turtle.

Map Comments

Map 1

- Big Rock Twp. – Forest Preserve District campsite
- Sugar Grove Twp. – Detention & Park Sites
- Aurora Twp. – Forest Preserve Gilman Trail (label trails)
- Sugar Grove Twp. – Waubensee Community College & Recent Pur. / Exch./ Kane County Forest Preserve District
- St. Charles Twp. – Girl Scouts sold to private property owner.

Map 2

- Blackberry Twp. – Is this golf course essential? It seems limited in function.
- St. Charles Twp. – Little Woods Forest Preserve

Map 3

- St. Charles Twp. – Lutheran School Foundation will be school in 2016
- St. Charles Twp. – will be developed private sector
- Elgin Twp. – ADID wetlands does not exist – mitigated in 90s.

Appendix 3

Green Infrastructure Map Core Layers

- **Water** – including lakes, ponds, rivers, and creeks
- **ADID Wetlands and Streams** – Advanced Identification of Wetlands (ADID) study of the location and quality of Kane County’s wetlands to advance the protection and restoration of high quality and functional wetlands and habitats. It can aid residents and organizations desiring to protect high quality resources or restore sites that have been degraded. It can inform landowners and developers about an appropriate course of action when they are considering disturbances in or adjacent to high quality sites. ADID results are only advisory to the federal regulatory process meaning that special scrutiny will be given to permit reviews. High quality habitat sites are considered unmitigatable.
- **200 Foot Buffer** - around creeks and wetlands
- **Hydrologic Atlas (HA)** - a range of water resources information including flood of record.
- **FEMA 100-year Flood Hazard Areas (2012)** - Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHA are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood.
- **Remnant Oak Woodlands - Used** presettlement vegetation information based on the public land survey notes from the early 1800s, 1939 aerial photography, soils data and aerial photography from 2011.
- **INAI Sites** – The Illinois Natural Areas Inventory provides a set of information about high quality natural areas, habitats of endangered species, and other significant natural features. Information from the INAI is used to guide and support land acquisition and protection programs by all levels of government as well as by private landowners and conservation organizations.
- **INPC Sites** – The Illinois Nature Preserves Commission designates the state’s most rare nature areas. It includes private and public lands that have rare plants, animals, or other unique natural features. It serves as a guide for the INPC when determining the eligibility of lands for protection. These last remaining remnants of our state’s natural heritage are almost all that is left of the way the state looked in the early 1800s. Today, less than 0.1% of the landscape remains as it did when first seen by Illinois’ early settlers.
- **T & E Species** – Threatened and endangered species are the species of mammals, birds, reptiles, amphibians, fishes, insects, plants, and other creatures that have been determined by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (for most marine life) to be in the greatest need of Federal

protection. A species is added to the list when it is determined to be endangered or threatened because of any of the following factors:

- the present or threatened destruction, modification, or curtailment of its habitat or range;
- overutilization for commercial, recreational, scientific, or educational purposes;
- disease or predation;
- the inadequacy of existing regulatory mechanisms;
- the natural or manmade factors affecting its survival

Due to the sensitivity of this information, the location of the T & E species is not available for viewing as a separate layer.

- **IDNR Biological Stream Rating**- Illinois Dept. of Natural Resources multi-tiered classification of streams based primarily on fish communities for the purpose of conserving biodiversity across the state. removed
- **NRCS Farmed Wetlands (2004)** - Areas where water covers the soil or is at or near the surface of the soil for at least a part of the year and are tilled and planted when conditions allow.
- **Forest Preserves** - Property owned by the Forest Preserve District of Kane County.
- **2040 Plan Open Space** – Land use considered to be open space in the Kane County 2040 Plan that includes ownership and/or management by conservation easements, homeowners associations, townships, park districts & municipalities.
- **Fen Recharge Areas**- Areas where mineral-rich surface and/or groundwater flow into an area (fen) which supports many plants adapted to high concentrations of dissolved alkaline minerals.
- **Aquifer Sensitivity Areas** – potential vulnerability of aquifers in an area to contamination from sources at or near the surface. removed
- **Class III Groundwater Recharge Areas** - groundwater that is a demonstrably unique, irreplaceable source, and suitable for the application of a water quality standard that is more stringent; groundwater that is vital for a particularly sensitive ecological system; or groundwater contributing to a dedicated nature preserve listed by the Illinois EPA.
- **Hydric Soils** - a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part. removed

Appendix 4

Green Infrastructure Map Mapping Rules

- Include fen recharge data
- Supporting layers are not included in core layers
- A buffer of 200 ft. was placed on the periphery of the most critical natural resource 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 to also be sensitive to activities and land uses in adjacent areas. Buffers also provide mapping connections for natural resource areas that appear separate on a map but actually function as one. The use of a 200 foot buffer is intended for planning purposes, and is not necessarily intended as a regulatory recommendation. For comparison, the Kane County Stormwater Ordinance stipulates stream (linear) and wetland (water body) buffer requirements ranging from 50 to 100 feet, depending on the resource quality and size, but have been designated as large as 200 feet in recent PUDs where sensitive watersheds containing wetlands; valuable habitat and plant species; and natural floodplain terraces or pristine streams occur. Furthermore, recommended habitat buffers reported in some writings on green infrastructure can exceed 300 ft. for sensitive wetland habitats or sites containing certain threatened or endangered species. Include minimum of 200' buffer (adjustments made at workshop) to the following layers:
 - water
 - wetlands
 - remnant oak woodlands
 - Illinois Natural Area Inventory (INAI) sites
 - Illinois Nature Preserves Commission (INPC) sites
 - Forest Preserve District of Kane County
 - regional trails
- Select a minimum of 50 acres for isolated polygons
- Add Class III special resource ground water protection boundaries (i.e. Trout Park) as an overlay
- Amend 1970's Flood-of-Record Maps to reflect urbanized/alterd/eliminated floodplain and depressional storage areas
- Include utility corridors if possible
- Identify unique geological features
- Include regional trails

Appendix 5

Additional Water Resource Elements

Capture Zones for High-Capacity Wells- Capture zones are portions of an aquifer within which groundwater flows toward a well. The Kane County Water Resources Investigations report by the ISWS and ISGS completed in 2009 identified capture zones of high-capacity wells in portions of the County where wells from adjacent municipalities are pumping from the same shallow aquifer capture zones, thus competing for the same water. When siting green infrastructure investments it is important to consider the location of these capture zones because, as the wells served by the capture zones are used over time, the benefits and expectations of the green infrastructure investment may be negatively impacted if groundwater levels decline.

For more detailed information and maps of some of the five- and twenty-year capture zones in Kane County, view the 2009 ISWS report here:

<http://www.isws.illinois.edu/docs/pubs/ISWSCR2009-07/>.

Surficial Geology & Soils- The Illinois State Geological Survey has mapped, by quadrangle, near-surface earth materials that are present as a result of glacial activity. This information, along with USDA Soil Survey data, is important to consult when assessing the best function for an investment in green infrastructure, so that the project works in harmony with nature. For example, area soils formed by glacial melt-water will likely have hydric soils, indicating a predisposition of the area as a wetland, marsh, or groundwater recharge area. Such areas and others can be identified by the surficial geology and soils.

Visit <http://www.isgs.illinois.edu/maps-data-pub/igg.shtml> to view surficial geology maps for a majority of Kane County quadrangles. USDA Soil Survey data can be found here:

<http://websoilsurvey.nrcs.usda.gov/app/>.

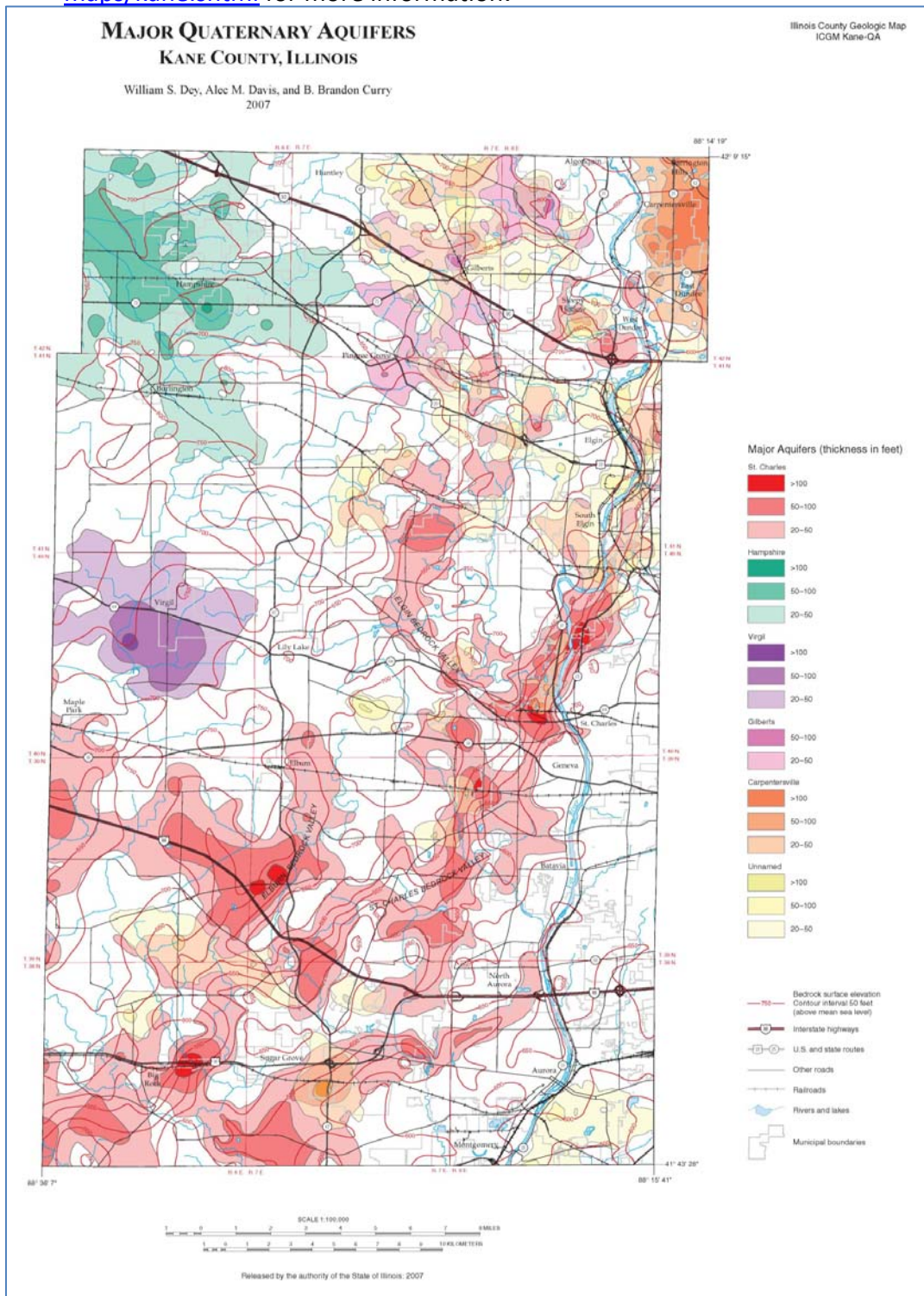
Leaking Underground Storage Tank (LUST) Sites- Illinois EPA maintains a record of leaking underground storage tanks, which can cause groundwater contamination. When siting green infrastructure that promotes water infiltration, it is important to be aware of the potential for groundwater contamination by checking for the presence of a LUST. If a LUST site is suspected or found, the owner of the LUST will need to work with IEPA to establish cleanup objectives, if they have not already done so.

For a listing of existing LUST sites in Kane County, visit <http://epadata.epa.state.il.us/land/ust/>.

Natural Floodplain Terraces- Floodplain terraces are formed by the natural flows of rivers and streams meandering, downcutting, and depositing sediment. The presence of natural floodplain terraces indicates a pristine stream where development has not affected the stream's sediment-transport balance. While an inventory of natural floodplain terraces in Kane County has not been performed, a few known examples include areas along Ferson Creek in the LeRoy Oakes Forest Preserve and along Mill Creek, east of Brundidge Road and north of the Union Pacific Railroad on Forest Preserve land. These and other natural floodplain terraces are particularly important to preserve when siting green infrastructure due to their historical and ecological importance.

Shallow Aquifers- When planning for green infrastructure, it is important to keep in mind the location of high capacity shallow aquifers. There are six shallow aquifer formations, which are generally 5 to 400 feet below the ground surface and consist of sands, gravels and the upper portions of fractured limestone or shale bedrock, in Kane County. Because these shallow aquifers are replenished from local rainfall infiltration and streams, green infrastructure siting which promotes infiltration into these shallow aquifers is particularly beneficial.

See map below or visit <http://www.isgs.illinois.edu/maps-data-pub/county-maps/kane.shtml> for more information.



Note: A full map with the scale and the associated map text, which must be referred to when interpreting this map, and other maps and references to the Kane County Water Resources Investigations by the ISWS and ISGS are available for viewing and downloading at the following web site as of July 2013: <http://www.isgs.illinois.edu/maps-data-pub/county-maps/kane.shtml> “

Appendix 6

Ordinance Checklist for Municipalities

Background and Purpose

The purpose of this checklist is to provide a template for the review of municipal and county stormwater, subdivision, zoning, and related development ordinances. The goal is to encourage ordinance provisions that promote sustainable development and redevelopment that protects water resources, natural resources, and quality of life. A related goal is to meet the intent of evolving state and federal Environmental Protection Agency standards that call for increased reliance on green infrastructure solutions.

This checklist is based on a combination of local, regional, and national ordinances and resources, including:

- *NIPC Facility Planning Area Nonpoint Source Management checklist*
- Progressive provisions of local municipal ordinances, countywide stormwater ordinances, and other municipal or county conservation design ordinances
- *NIPC/CMAP Ecological Planning and Design Directory*
- *Blackberry Creek Watershed: Zoning Code Analysis and Ordinance Language Recommendation report (Kane County, 2004)*
- *U.S. EPA Water Quality Scorecard*
- Center for Watershed Protection, *Better Site Design (Code and Ordinance Worksheet and related publications)*

The ordinance review addresses five major topical areas. These include:

- 1) Comprehensive Stormwater Standards**
 - a. Stormwater drainage and detention
 - b. Soil erosion and sediment control
 - c. Floodplain management
 - d. Stream and wetland protection
- 2) Natural Area Standards**
- 3) Landscaping Standards**
- 4) Impervious Area Reduction: Street and Parking Requirements**
- 5) Conservation Design: Zoning/Subdivision Standards**

1. Comprehensive Stormwater Standards

A comprehensive stormwater ordinance should address stormwater and erosion impacts of development on runoff quantity and water quality. The ordinance also should regulate impacts to streams and wetlands in an attempt to minimize adverse impacts to aquatic habitat.

General Recommendations: Adopt progressive, comprehensive standards for the protection of water resources and related aquatic resources. In particular, ordinances should go beyond a core emphasis on stormwater rate and quantity to also emphasize holistic protection of water quality, natural hydrology, and aquatic habitat. These items can be addressed through an integrated approach to stormwater drainage and detention, soil erosion and sediment control, floodplain management, and stream and wetland protection.

2. Natural Area Standards

This section focuses on protection, restoration, and management of natural areas. These recommendations address *remnant* landscapes as well as *restored/created* natural areas. Comprehensive stormwater ordinances should address, to a large degree, protection of streams and wetlands. However, most stormwater ordinances do not specifically address associated upland natural areas – such as prairies, savannas, and woodlands – that buffer aquatic systems and provide critical landscape linkages for wildlife.

General Recommendations: Identify, map, and plan for the protection of a green infrastructure network that recognizes aquatic and upland resources to be protected, along with appropriate buffers. This could be accomplished via a series of community-wide “natural areas overlay districts.” Identified natural areas could be protected via strict development prohibitions or through flexible zoning that allows for clustering around sensitive areas. Specific standards should address natural area identification, allowable uses and vegetative cover within the natural area, buffer transitions, and other design elements.

In addition, preparation of management plans should be required for designated natural areas and buffers. Further, performance criteria, qualified management entities, and revenue sources for management activities should be institutionalized.

3. Landscaping Standards

Natural landscaping can greatly benefit the preservation of water quality and natural hydrology. Natural landscaping can be encouraged and/or required, where appropriate, in common areas in lieu of conventional turf grass landscapes. It also can be specifically targeted to BMP applications, such as bio-infiltration swales, rain gardens, filter strips, and naturalized detention basins.

Unfortunately, some landscaping ordinances may (unintentionally) discourage the use of natural landscaping via “weed” prohibition language. Some ordinances also require the physical separation of pervious and impervious surfaces on site, thereby effectively preventing runoff from impervious surfaces flowing onto pervious areas. A common example is the requirement to install raised landscape islands (vs. recessed islands) in parking lots.

General Recommendations: Landscaping ordinances should encourage and/or require the integration of pervious, landscaped areas with the impervious areas of the site. Runoff, where feasible, should be routed across and through landscaped areas. Wherever feasible and appropriate, deep-rooted natural landscaping should be used in lieu of conventional, shallow-rooted turf grass landscaping. This should be accompanied by ordinance performance criteria for the establishment of attractive and ecologically sustainable natural landscapes and legal and financial provisions (such as a back-up Special Service Area) for their long-term management. Language to specifically allow/require integration of bio-infiltration into parking lot islands and street side landscape strips also is recommended.

Tree protection language is recommended to provide protection of desirable (e.g., native) trees and shrubs. Flexibility should be provided to allow removal of trees where appropriate for proper forest/natural area management, along with the inclusion of replacement criteria for the unavoidable removal of desirable species.

4. Impervious Area Reduction: Street and Parking Requirements

A significant proportion of the impervious surfaces, which are the primary sources of stormwater impacts, is related to streets and highways. Limiting the amount of impervious cover to that which is necessary and to the most appropriate areas is a key to ecologically sensitive design.

Similarly, parking facilities often create large impervious surfaces that result in an increase in stormwater runoff and related water quality issues. Reduced parking area and alternative porous paving materials can help to reduce impervious surfaces and facilitate infiltration and groundwater recharge.

General Recommendations:

Revised design standards for narrower street widths, along with allowances for street designs that utilize naturalized stormwater infiltration and conveyance systems, should be incorporated into current codes. Also, since stream crossings can cause significant stream impacts, recommended standards related to the number of crossings and the design of crossings should be considered.

Parking standards can be updated to allow for shared parking, parking credit programs (i.e., purchasing credits for public parking in lieu of creating private spaces), and preferred parking for compact cars and non-motorized vehicles. Specific language to allow permeable parking surfaces such as interlocking concrete pavers, porous asphalt, and porous concrete is recommended. In addition (as noted above) parking lot design standards should encourage or require practices that enhance runoff infiltration and cleansing, such as bioswales, rain gardens, and filter strips.

5. Conservation Design: Zoning/Subdivision Standards

Some of the approaches and standards discussed above may be inconsistent with existing zoning and subdivision codes. Therefore, greater flexibility is needed in existing codes to allow, encourage, and/or require creative, conservation-based site designs. One obvious way to enable creative designs is to incorporate standards for “clustering” of residential developments. This can provide a number of benefits, including allowing additional room for the incorporation BMPs; reducing mass grading; allowing shorter street networks; and protecting natural areas and open space without reducing the number of lots.

General Recommendations: Conservation design should be encouraged or required in zoning and/or subdivision codes. Options are to allow conservation design by right, require it for all sites containing sensitive natural resources, or require it for all developments. Conservation design would ideally incorporate a four-step site design process for residential developments.

- Identify and preserve natural resources, natural drainage features, and sensitive areas.
- Locate buildable areas to minimize impacts on natural areas and to take advantage of open space and scenic views.
- Design the street network to minimize encroachment in sensitive natural areas.
- Establish lot lines and lot sizes following a cluster development approach.

It also may be desirable to offer density bonuses to incentivize conservation design elements that exceed the minimum ordinance requirements. As noted above, conservation developments should include clear institutional and financial arrangements for the long-term ownership and management of open spaces and natural areas.

Ordinance Checklist for Municipalities

1. Comprehensive Stormwater Standards

Stormwater Drainage and Detention		Yes / No	Code section	Current standard	Recommended standard or action	Reference
Purpose	Include control of runoff rate, volumes, and quality in the purpose statement?					NIPC Model Stormwater Drainage and Detention Ordinance, Section 100.0
Minimize stormwater quantity	Encourage the use of permeable paving, green roofs, and similar practices that reduce the quantity of runoff that must be handled with innovative or conventional drainage practices?					Village of Lakewood's Best Management Practices for R-2 Zoning, BMP hierarchy
Natural drainage practices	Encourage/require the use of natural drainage practices (e.g., swales, filter strips, bio-infiltration devices, and natural depressions over storm sewers) to minimize runoff volumes and enhance pollutant filtering?					Campton Hills Zoning Code Analysis and Ordinance Language Recommendations; NIPC Model Stormwater Drainage and Detention Ordinance, Sections 500.0 and 711
Detention credits	Provide detention credit for practices, such as permeable paving or bio-infiltration, that provide temporary storage of runoff in the sub-surface void spaces of stone or gravel?					Kane County Stormwater Management Article 2, Sec. 200 e5 (as amended in 2009).
Discharge	Require that peak post-development discharge from events less than or equal to the two-year, 24-hour event be limited to 0.04 cfs per acre of watershed? (The Kane County Stormwater Ordinance effectively achieves a 2-year control similar to this by virtue of its 0.1 cfs/acre requirement for the 100-year event.)					
Detention design	Require detention design standards that maximize water quality mitigation benefits, with a requirement for "naturalized" wet bottom and/or wetland basins over dry basins?					NIPC Model Stormwater Drainage and Detention Ordinance, Sections 600, 705, and 706, provides design guidelines.
Water quality performance standards	Require conformance to numerical water quality performance standards (such as percent removal of sediment or phosphorus)?					New practice being used elsewhere in the country, yet to be implemented in NE Illinois.
Detention - on-stream and floodway	Prohibit on-stream detention and detention in the floodway, unless it provides a regional stormwater storage benefit (e.g., for upstream properties and/or multiple sites) and is accompanied by other upstream water quality BMPs, such as bio-infiltration?					NIPC Model Stormwater Drainage and Detention Ordinance Section 708.3
Stormwater discharge	Prohibit the direct discharge of un-detained stormwater into wetlands?					NIPC Model Stormwater Drainage and Detention Ordinance, Section 709.4
Maintenance	Require formal maintenance plans and contracts for the long-term maintenance and vegetative management of all new detention facilities?					Performance criteria outlined in the stewardship plan section (A1118) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures. NIPC Model Stormwater Drainage and Detention Ordinance, Section 713 and 1100.

Soil Erosion and Sediment Control		Yes / No	Code section	Current standard	Recommended standard or action	Reference
Limiting sediment delivery	Include a comprehensive purpose statement which limits sediment delivery, as close as practicable, to pre-disturbance levels and minimizes effects on water quality, flooding, and nuisances?					NIPC Model Soil Erosion and Sediment Control Ordinance, Section 100
Minimize sediment transport	Include a comprehensive set of principles that minimize sediment transport from the site for all storms up to the ten-year frequency event? (These principles should include provisions to minimize the area disturbed and the time of disturbance; follow natural contours; avoid sensitive areas; require that sediment control measures be in place as part of land development process before significant grading or disturbance is allowed; and require the early implementation of soil stabilization measures on disturbed areas.)					
Ordinance applicability - size	Require ordinance applicability for any land disturbing activity in excess of 5,000 square feet?					
Ordinance applicability - location	Require ordinance applicability for any land disturbing activity in excess of 500 square feet if adjacent to stream, lake, or wetland?					
Site design requirements	Include explicit site design requirements for sediment control measures, conveyance channels, soil stabilization, construction adjacent to water bodies, construction entrances, etc.?					
Site design references	Adopt by reference the "Illinois Urban Manual" published by the Natural Resources Conservation Service and the Illinois Environmental Protection Agency (1995, updated 2010) and the "Illinois Procedures and Standards for Urban Soil Erosion and Sedimentation Control" published in 1988 (the Greenbook)? (These references provide additional design standards and guidelines beyond the specific standards spelled out in the ordinance.)					
Maintenance	Require routine maintenance of all erosion and sediment control practices?					
Inspection	Require inspection by appropriately trained personnel of construction sites at critical points in the development process to ensure that measures are being correctly installed and maintained?					NIPC Model Soil Erosion and Sediment Control Ordinance, Section 506; City of Elgin (Article 3, Sec. 300 and Article 7, Sec. 701).
Enforcement	Provide effective enforcement mechanisms including performance bonds, stop-work orders, and penalties, as appropriate?					

Floodplain Management		Yes / No	Code section	Current standard	Recommended standard or action	Reference
Purpose	Include protection of hydrologic functions, water quality, aquatic habitat, recreation, and aesthetics in the purposes for the ordinance?					
Floodway restrictions - use	Restrict modifications in the floodway to the following appropriate uses: public flood control projects, public recreation and open space uses, water dependent activities, and crossing roadways and bridges? (The ordinance would thereby prohibit new treatment plants and pumping facilities; detached garages, sheds, and other non-habitable structures; parking lots and aircraft parking aprons; and roadways which run longitudinally along a watercourse.)					NIPC Model Floodplain Ordinance, Section 802.1 <i>Alternative</i>
Limit stream channel modification	Discourage stream channel modification and require mitigation of unavoidable adverse water quality and aquatic habitat impacts? (This would be done in cooperation with the Army Corps of Engineers for federally jurisdictional waterways.)					NIPC Model Floodplain Ordinance, Sections 801.1.q and 802.1.i
Floodway restrictions - erosion	Require effective soil erosion and sediment control measures for ALL disturbances in the floodway?					

Pollution Prevention		Yes / No	Code section	Current standard	Recommended standard or action	Reference
Groundwater protection	Regulate activities within groundwater protection areas?					City of St. Charles, IL Chapter 13: Groundwater Protection; City of Marengo, IL, M.C. Chapter 30: Groundwater protection; Fox River Grove, IL, M.C. Article IX, Section 23-200 Groundwater protection; McHenry County Groundwater Protection Action Plan.
Surface water protection	Regulate activities within the flood plain or buffer areas of water bodies?					
Phosphorus reduction	Discourage the use of phosphorus in manufactured fertilizers in order to reduce the amount of phosphorus that enters water resources?					McHenry County Phosphorus Model Ordinance
	Discourage the use of phosphorus in dishwasher detergents in order to reduce the amount of phosphorus that enters water resources?					
Chloride management	Specify road salt storage and handling requirements that ensure proper storage, handling, and transport?					
	Specify alternative compounds or methods for dust control?					
	Encourage water softeners be set to recharge on demand?					
Coal tar sealants	Discourage use of coal tar sealants to prevent loss of aquatic life?					McHenry County Coal Tar Sealants Model Ordinance
Pet waste disposal	Include pet waste disposal requirements?					State of New Jersey Pet Waste Model Ordinance
Private sewage treatment and disposal	Require regular inspection and maintenance of private sewage treatment (septic) systems?					Public Health Ordinance for McHenry County, Article X, Wastewater & Sewage Treatment and Disposal for McHenry County Illinois

2. Natural Area Standards

Stream and Wetland Protection		Yes / No	Code section	Current standard	Recommended standard or action	Reference
Purpose	Include a comprehensive purpose statement which addresses the protection of hydrologic and hydraulic, water quality, habitat, aesthetic, and social and economic values and functions of wetlands?					NIPC Model Stream and Wetland Protection Ordinance, Section 3.00
Water body protection	Protect the beneficial functions of streams, lakes, and wetlands from damaging modifications, including filling, draining, excavating, damming, impoundment, and vegetation removal? (This could be done through some combination of avoidance and mitigation requirements, similar to Army Corps of Engineer requirements for federally jurisdictional waters.)					NIPC Model Stream and Wetland Protection Ordinance, Sections 6.03, with the definition of development outlined in Section 4.00.h.
Water body modification	Prohibit the modification of high quality, irreplaceable wetlands, lakes, and stream corridors?					
Water body - stormwater	Discourage the modification of wetlands for stormwater management purposes unless the wetland is severely degraded and nonpoint source BMPs are implemented on the adjacent development?					NIPC Model Stream and Wetland Protection Ordinance, Section 6.03
Water body setback	Designate a minimum 75 to 100 foot setback zone from the edge of identified wetlands and water bodies in which development is limited to the following types of activities: minor improvements like walkways and signs, maintenance of highways and utilities, and park and recreational area development?					NIPC Model Stream and Wetland Protection Ordinance, Section 6.03
Water body buffer	Establish a minimum 30-foot wide protected native vegetation buffer strip along the edge of identified wetlands and water bodies?					NIPC Model Stream and Wetland Protection Ordinance, Section 6.08
Relocation	Prohibit watercourse relocation or modification except to remedy existing erosion problems, restore natural habitat conditions, or to accommodate necessary utility crossings; and require mitigation of unavoidable adverse water quality and aquatic habitat impacts?					NIPC Model Stream and Wetland Protection Ordinance, Sections 7.00, 7.01, and 7.02
Restoration	Encourage the restoration of stream and wetland habitat, hydrology, and morphology on development sites that contain degraded aquatic systems? (This could be accomplished through a streamlined permitting process and/or other development incentives.)					Minimum performance standards for restoration, planting, maintenance, and monitoring of natural open space and naturalized stormwater facilities are included in Stewardship Plan section (A1118) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.

Natural Areas and Open Space		Yes / No	Code section	Current standard	Recommended standard or action	Reference
Natural areas protection	Protection of remnant natural areas, including steep slopes, prairies, woodlands, and savannas (in addition to regulated wetlands and floodplains)?					Applicability section (A1102) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures; Village of Algonquin Conservation Design Standards and Procedures (Zoning Sec. 21.11 J); City of Crystal Lake Conservation Developments (UDO Article 5 Section 5-300).
Open space - amount	Setting aside onsite open space for residential development, generally conforming to the following guidelines: estate residential: 60%; moderate residential: 45%; urban residential: 30%? (Common open space is preferable, but deed-restricted open space also is acceptable.)					Bulk requirements section (A1112) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
Restoration	Restoration of protected natural areas to reduce invasive species and enhance biodiversity?					Stewardship plan section (A1118) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
Open space - ownership	Identification of an open space ownership entity, with a preference for a qualified public or private land conservation organization?					Open space ownership and funding section (A1117) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures
Open space - easement	Dedication of natural open space via a binding conservation easement or similar binding legal instrument that ensures protection in perpetuity?					Open space ownership and funding section (A1117) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures
Open space - management	Secure and permanent funding arrangements for the long-term management and maintenance of open space, natural areas, and stormwater facilities once responsibilities are turned over to a conservation entity or the homeowners/property owners association? (Said funding arrangements shall be noted and made part of the Covenants and Restrictions.)					Open space ownership and funding section (A1117) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures
Open space - funding	Establishment of a back-up special service area (SSA) in order to provide funds necessary to support the maintenance of open space and stormwater management areas (in the event that the responsible land owner/manager does not meet the required maintenance standards)?					Open space ownership and funding section (A1117) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures
Open space - management plans	Long-term management/stewardship plans for all common open space areas, natural areas, and stormwater facilities?					Stewardship plan section (A1118) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures
Open space - performance criteria	Meeting measurable performance criteria for managed natural areas, including ground coverage, species diversity, and control of invasive species?					Minimum performance standards for restoration, planting, maintenance, and monitoring of natural open space and naturalized stormwater facilities are included in the Stewardship Plan section (A1118) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.

3. Landscaping Standards

Landscaping		Yes / No	Code section	Current standard	Recommended standard or action	Reference
Native landscaping	Include “noxious weed” provisions that might intentionally, or unintentionally, preclude natural landscaping because of vegetation height standards or similar restrictive provisions?					<i>Plants of the Chicago Region</i> (Swink and Wilhelm, 1994) and <i>Green Landscaping: Greenacres</i> , A source book on Natural Landscaping for Public Officials
Native landscaping	Encourage/require the use of native plant materials for the default landscaping of common areas, stormwater facilities, common open space areas, and the buffers of streams, lakes, wetlands and other natural areas?					Natural landscaping standards section (A1110) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures
Native landscaping - management	Require provisions for long-term oversight, management, funding, and performance criteria for common areas and natural landscapes (as referenced above in greater detail)?					
Street trees	Require planting street trees? If yes, how many trees?					Park Forest Sustainability Audit of Zoning and Subdivision Codes
Tree protection ordinance	Require protection of native/desirable trees (i.e., a tree protection ordinance)?					Tree protection standards section (A1119.2 C) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Practices; City of Elgin Tree Protection Ordinance (Zoning 19.16).
Tree replacement	Require replacement of any trees that are unavoidably impacted by construction activities?					Tree protection standards section (A1119.2 C) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Practices.
Tree replacement - funding	Require payment into a tree replacement fund or “mitigation bank” when removed trees cannot be replaced/mitigated on site?					

4. Impervious Area Reduction

Transportation		Yes / No	Code section	Current standard	Recommended standard or action	Reference
Street network - location	Require the street network to minimize encroachment in sensitive natural resources and take advantage of open space vistas, while providing an interconnection of internal streets and street connections to adjoining land parcels to create opportunities for future connectivity?					Blackberry Creek Zoning Code Analysis and Ordinance Language Recommendations
Street network - Stream crossings	does the ordinance limit stream crossings by the street network?					Campton Hills Zoning Code Analysis and Ordinance Language Recommendations
Street connectivity - external	require connections to surrounding areas?					LEED for Neighborhood Development Walk-able Streets Prerequisite.
Street connectivity - internal	Require subdivisions to achieve a certain score on an index for internal street connectivity?					Park Forest Sustainability Audit of Zoning and Subdivision Codes
Street - Widths	Encourage/require residential street widths that are narrower than suburban norms (i.e., encourage streets to be no wider than is necessary to move traffic effectively, to slow traffic and create safer conditions, and to safely accommodate pedestrians and bicyclists)?					Model language in Conservation Design Resource Manual, NIPC and Chicago Wilderness; Center for Watershed Protection Better Site Design; ITE Designing Walk-able Urban Thoroughfares: A Context Sensitive Approach; CNU Emergency Response & Street Design; Village of Plainfield Traditional Neighborhood District (Zoning Sec. 9-54); City of Crystal Lake Street Standards for Conservation Design (UDO Article 4 Section 4-100 E).
Street - Frontage roads	Discourage frontage roads?					ITE Designing Walk-able Urban Thoroughfares: A Context Sensitive Approach.
Street - Length	Front and side yard setbacks, minimum lot size					Center for Watershed Protection Better Site Design; Village of Plainfield Traditional Neighborhood District (Zoning Sec. 9-54).
Cul-de-sacs	Discourage cul-de-sacs?					Center for Watershed Protection Better Site Design
Driveways - Commercial	Encourage/require reduced driveway widths?					
Driveways - Residential	Encourage/require reduced driveway widths for single-family developments?					Center for Watershed Protection Better Site Design
Driveways - Shared	Encourage/require shared driveways?					Street and trail standards section (A1108.1 H) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Practices; NIPC Conservation Design Resource Manual, Common Drives model ordinance.
Curb and gutter requirements	Encourage/require the use of natural drainage practices?					Campton Hills Zoning Code Analysis and Ordinance Language Recommendations
Paving materials - streets and driveways	Promote use of pervious materials for paved areas, including alleys, streets, sidewalks, crosswalks, driveways, and parking lots?					Center for Watershed Protection Better Site Design; Campton Hills Zoning Code Analysis and Ordinance Language Recommendations
Sidewalks	Promote connected sidewalks in new developments and use of pervious materials?					Blackberry Creek Zoning Code Analysis and Ordinance Language Recommendations; LEED for Neighborhood Development Walk-able Streets Prerequisite.

Parking		Yes / No	Code section	Current standard	Recommended standard or action	Reference
Purpose	Does the purpose include a statement about tailoring parking requirements to meet average day-to-day demand as opposed to peak demand?					
Applicability	Do off-street parking requirements only apply to lots of a certain size or greater?					Village of Riverside: no off-street parking spaces required for non-residential uses under 3,000 sq. ft GFA. City of Evanston: no off-street parking spaces required for buildings between 2,000 to 3,000 sq. ft. GFA in specific districts.
Requirements	Establish parking requirements as a maximum or a minimum?					Campton Hills Zoning Code Analysis and Ordinance Language Recommendations
Parking ratio - office	Require a parking ratio for a professional office building that is 3 spaces, or less, per 1,000 square feet?					NW Connecticut Model Zoning Regulations for Parking and State of Oregon's Model Development Code and User's Guide for Small Cities
Parking ratio - retail	Require a parking ratio for retail that is 4.5 spaces, or less, per 1,000 square feet?					NW Connecticut Model Zoning Regulations for Parking and State of Oregon's Model Development Code and User's Guide for Small Cities
Parking ratio - residential	Require a parking ratio for a single family home that is 2 spaces, or less?					NW Connecticut Model Zoning Regulations for Parking and State of Oregon's Model Development Code and User's Guide for Small Cities
Requirements - flexibility	Provide flexibility regarding alternative, reduced parking requirements and discourage over-parking of developments?					Campton Hills Zoning Code Analysis and Ordinance Language Recommendations
	Allow a reduction in the number of current parking spaces?					
Off-site parking	Provide flexibility regarding alternative, reduced parking requirements (e.g., shared parking, off-site parking) and discourage over-parking of developments?					NW Connecticut Model Zoning Regulations for Parking
Shared parking	Provide flexibility regarding alternative, reduced parking requirements (e.g., shared parking, off-site parking) and discourage over-parking of developments?					NW Connecticut Model Zoning Regulations for Parking; City of Elgin Shared Off-Street Parking Facilities (Zoning 19.45.055); Village of Plainfield Shared parking (Zoning Sec. 9-74).
Requirements - location	Provide for uses in downtown areas by reducing or not requiring parking given the walk-able, transit served location?					
Credits - on-street parking	Allow a reduction in off street parking requirements when nearby on street parking is available?					State of Oregon's Model Development Code and User's Guide for Small Cities
Credits - bicycle	Allow a reduction in off street parking requirements when bicycle parking is provided?					Campton Hills Zoning Code Analysis and Ordinance Language Recommendations
Size - parking stall	Require parking stalls to be less than or equal to 9 x 18 feet?					Center for Watershed Protection Better Site Design, State of

						Oregon's Model Development Code and User's Guide for Small Cities
Size - parking stall	Allow for reduction in parking stall size to account for vehicle overhang onto landscaped islands or perimeter landscaping? (E.g., such flexibility might allow for an 18-foot deep stall to be reduced to 16 or 16.5 feet deep.)					Center for Watershed Protection Better Site Design
Size - compact stalls	Specify that a percentage of all parking stalls can be dedicated for compact cars, with correspondingly smaller stall dimensions?					
Size - parking aisles	Establish narrower aisle widths to minimize impervious surfaces?					Blackberry Creek Zoning Code Analysis and Ordinance Language Recommendations
Paving materials	Promote use of pervious materials for paved areas, including parking lots?					Center for Watershed Protection Better Site Design; LEED for Neighborhood Development Heat Island Reduction Credit.
Landscaping - amount	Specify a minimum percentage of pervious landscaping for parking lots?					City of Crystal Lake: Site Landscaping (UDO Article 4 Section 4-400 F1 and F2)
Landscaping - design	Encourage/require the use of recessed landscape islands (vs. raised islands) to facilitate the infiltration and filtering of parking lot runoff?					City of Crystal Lake Standards for Parking Areas in Conservation Developments (UDO Article 4 Section 4-200 E5); Village of West Dundee Parking Lot Design and Maintenance Standards (Zoning 10-9-1-6 C); Parking lot standards section (A1111.1) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Practices.

5. Conservation Design

Conservation Design and Infill		Yes / No	Code section	Current standard	Recommended standard or action	Reference
Natural Resource inventory	Require a site analysis map that includes a natural resources inventory at the Concept Plan stage or prior to the Preliminary Plan stage?					Site analysis (A1104.1) requirements of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures
Site Design	Require that the proposed development be designed to preserve natural drainage patterns, use and preserve native vegetation, stabilize soils during construction, and protect, enhance, and maintain natural resources (such as remnant woodlands, prairies, and steep slopes)?					Site analysis (A1104.1), general standards for design (A1108), and open space (A1114) requirements of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures; Village of Algonquin Conservation Design Standards and Procedures (Zoning Sec. 21.11 J); City of Crystal Lake Conservation Developments (UDO Article 5 Section 5-300 E2).
Clearing and Grading						Campton Hills Zoning Code Analysis and Ordinance Language Recommendations
Clustering	Encourage/require clustering of residential lots around sensitive natural areas, thereby creating a protected common open space area?					Site capacity (A1105) and conservation design development standards (A1108.1) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures
Open space requirements	Require a minimum area of protected naturalized open space in new residential developments?					Bulk requirements section (A1112) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
Density bonus	Provide density bonuses for conservation developments that exceed minimum standards (such as additional open space, providing for regional trails and greenways, or incorporating environmentally sensitive design features beyond what is required by the Ordinance)?					Density bonuses for open space and innovative design section (A1106) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures
Conservation design - by right	Allow conservation design as a "by-right" form of development?					Applicability section (A1102) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures; Village of Plainfield Conservation District (Zoning 9-52).
Conservation design - zoning map	Does the zoning map indicate areas where conservation development is required?					Applicability section (A1102) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures
Mixed use	Is there a downtown overlay district or another mechanism to encourage mixed-use development in neighborhood centers?					
Impact fees	Are there reduced impact fees or other incentives to encourage infill development?					

Water Efficiency and Conservation		Yes / No	Code section	Current standard	Recommended standard or action	Reference
Water conservation - indoor	Encourage/require plumbing fixtures and fittings in all new and remodeled construction to not exceed specific flow rates and be labeled a WaterSense product if available? Encourage/require dishwashers and clothes washers in all new and remodeled construction to comply with US EPA Energy Star Program requirements?					CMAP Model Water Use Conservation Ordinance, 1.0, 2.0, 3.0, 8.0, 9.0, 10.0, 11.0, 12.0, and 13.0.
Outdoor - landscape design	Set guidelines for the amount of development area dedicated to turf, high water use plants, or water features; and the minimum amount of topsoil for turf areas?					CMAP Model Water Use Conservation Ordinance, 4.0., 14.0
Outdoor - irrigation equipment	Set requirements for automatic landscape irrigation systems?					CMAP Model Water Use Conservation Ordinance, 5.0., 15.0
Outdoor - irrigation schedule	Set requirements for landscape watering days and schedules?					Northwest Water Planning Alliance's Regional Water Conservation Lawn Watering Ordinance; CMAP Model Water Use Conservation Ordinance, 5.0., 6.0, 7.0, 15.0, 16.0, 17.0, and 23.0.
Rainwater harvesting and water reuse	Allow the installation of a rainwater harvesting system to be used for landscape irrigation and indoor non-potable uses?					CMAP Model Water Use Conservation Ordinance, 18.0 and 19.0; McHenry County Water Reuse Model Ordinance
Downspout - sanitary sewer connection	Are there restrictions on downspouts being directly connected to a sanitary sewer?					
Downspout - storm sewer connection	Are there restrictions on downspouts being directly connected to a storm sewer?					City of Milwaukee Downspout Disconnection ordinance
Water waste prevention	Does the community prohibit water waste or inefficient use of water?					CMAP Model Water Use Conservation Ordinance, 21.0.
Water pricing	Does the community use a conservation pricing structure or other economic incentive to promote water conservation?					CMAP Model Water Use Conservation Ordinance, 32.0

Appendix 7

References and Additional Resources

The following topics are included in this Appendix as references from the document and to provide additional resources:

- Conservation Design/Development Ordinances
- Easements
- Ecological Planning
- Funding
- Green Infrastructure
- Local Governments
- Watersheds

Conservation Design/Development Ordinances

Algonquin

In order to create a more livable and sustainable community, the Village of Algonquin has committed to preserving the integrity of its natural resources and to providing long-term ecological management, by adopting conservation design standards and procedures. In 2008, the Village adopted Conservation Design Standards and Procedures that encourages infill development and redevelopment and requires developers and consultants to work with the natural landscape of the land by developing around them rather than destroying and recreating them elsewhere. These new development regulations would apply to proposed developments or redevelopment of one acre or larger in size that contain or abut sensitive natural resource areas, such as those designated in the McHenry County Natural Area Inventory of streams, rivers, and lakes designated as Advanced High Quality habitats. Developers can voluntarily apply as a layout and quality of design that incorporates environmentally sensitive design features that exceed the minimum requirements of the ordinance.

http://www.algonquin.org/egov/docs/1317742754_727294.pdf

Chicago Metropolitan Agency for Planning (CMAP)

The *Model Water Use Conservation Ordinance*, developed in 2010, is an update of the 1980 version in order to address various federal acts, advances in water efficiencies as well as findings of the Northeastern Regional Water Supply/Demand Plan adopted in 2010. This document is intended to serve as an

implementation tool for the water conservation recommendations detailed in the above plan.

<http://foxriverecosystem.org/WatershedPlanning/JointDocs/ModelWaterUseConservationOrdinance.pdf>

Chicago Wilderness

A number of excellent resources have been developed for the northeastern Illinois by the former Northeastern Illinois Planning Commission (now CMAP), Chicago Wilderness, and others. An overview of conservation design techniques is provided in *Conservation Development in Practice*:

http://www.chicagowilderness.org/sustainable/conservation_dev_practice.php.

A more detailed discussion of conservation design ordinance considerations, including subdivision and zoning codes, can be found in *Conservation Design Resource Manual*:

http://www.chicagowilderness.org/sustainable/conservationdesign/Manual/Conservation_Design_Resource_Manual.pdf.

Kane County

The *Blackberry Creek Watershed: Zoning Code Analysis and Ordinance Language Recommendations*, is a continuation of ongoing efforts to reduce the negative impacts of stormwater and improve the quality of life in the Blackberry Creek Watershed. The purpose of this ordinance language project is to provide suggested ordinance revisions to each of the municipalities and counties located within the Blackberry Creek Watershed.

<http://www.co.kane.il.us/kcstorm/blackberry/zoning/FinalReport.pdf>

McHenry County

McHenry was the first county in the region to adopt a comprehensive conservation design ordinance in 2009. Based on water resource, quality of life, and natural resource themes of its 2030 Comprehensive Plan, the County adopted a "Land First" approach to development. The ordinance, which is written as an addendum to the County's subdivision code, requires conservation design for all development sites that have significant areas of sensitive natural resources and allows conservation development as a right for all other subdivisions.

<http://www.co.mchenry.il.us/departments/planninganddevelopment/Documents/Ordinances/Conservation%20Design%20Addendum.pdf>

Settler's Ridge

Approximately forty percent (526 acres) of the development has been or will be restored to a native prairie habitat.

<http://www.hitchcockdesigngroup.com/B-3-Profile-5-RED-3-2-Settlers-Ridge.html>

Easements

Illinois Department of Natural Resources

The Conservation Stewardship Program was designed to encourage landowners to maintain unimproved land in order to protect limited environmental resources.

The bill offered the incentive of reduced valuation for property taxes to landowners who were willing to commit to maintaining and managing unimproved land. Landowners who wish to receive the special valuation for unimproved land provided by this law are required to prepare a Conservation Management Plan according to rules developed by the Department of Natural Resources (DNR). That Plan will describe how the land will be managed to protect and maintain environmental resources. When a Conservation Management Plan is approved, DNR will notify the Department of Revenue who will then notify the appropriate county assessor of the properties that have qualified for the special valuation and the necessary adjustment in the valuation will be made.

<http://www.dnr.state.il.us/stewardship/>

The mission of *The Illinois Nature Preserves and Land and Water Reserves Program (INPC)* is to assist private and public landowners in protecting high quality natural areas and habitats of endangered and threatened species in perpetuity, through voluntary dedication or registration of such lands into the Illinois Nature Preserves System. The Commission promotes the preservation of these significant lands and provides leadership in their stewardship, management and protection. Many private landowners who have rare, natural areas decide to voluntarily dedicate their property as a nature preserve. Nature preserves landowners:

- Retain title to their land
- Have their property tax reduced by changing the assessed value to \$1 per acre
- Receive stewardship assistance for their site
- Preserve their rare land for future generations

INPC staff members work with landowners. Staff discusses the importance of the resources on landowners' property, the owners' long term wishes, and the

voluntary protection programs available through the INPC. Options available to landowners include nature preserve dedication, land and water reserve registration or enrollment as an Illinois natural heritage landmark.

<http://www.dnr.state.il.us/INPC/index.htm>

The mission of *the Conservation Foundation* is to preserve open space and natural lands, protect rivers and watersheds, and promote stewardship of our environment in DuPage, Kane, Kendall and Will Counties, Illinois. The Conservation Foundation accepts the donation of conservation easements, monitors those easements, and assists landowners in navigating the easement process. They also arrange for the donation or purchase of conservation easements that will be held by other entities. Often, a government agency or an organization other than the Foundation is the most appropriate easement holder. In those cases, the Foundation does what is necessary to assist in putting the easement into place to be held by the best local entity.

<http://www.theconservationfoundation.org/>

Openlands unites the people and resources of the diverse Chicago metropolitan region around the goal of land and water protection, providing a healthy vibrant space to live and work. Landowners who want to protect all or certain portions of their land can donate a conservation easement to Openlands. They ensure that defined restrictions continue to govern land use and protect the conservation values forever. Openlands also works on behalf of landowners who are interested in conveying a conservation easement to another organization. They serve as advisors and consultants, guiding the landowner through the process, helping to negotiate terms, and answering questions along the way.

<http://www.openlands.org/>

Ecological Planning

Chicago Wilderness

The Ecological Planning and Design Directory is a wealth of tools and techniques for achieving sustainable development that is both environmentally sensitive and cost-effective. The Directory presents a set of best practices that individuals, businesses, governments, and other organizations can implement to the benefit of their communities.

<http://www.chicagowilderness.org/what-we-do/protecting-green-infrastructure/epdd-resources/>

Funding

Illinois Department of Natural Resources

The *Open Space Lands Acquisition and Development (OSLAD) Program* is a state-financed grant program that provides funding assistance to local government agencies for acquisition and/or development of land for public parks and open space. The federal Land & Water Conservation Fund program (known as both LWCF and LAWCON) is a similar program with similar objectives. Both are managed in Illinois by the Department of Natural Resources with concurrent application due dates, equal grant maximums and similar general rules. Projects vary from small neighborhood parks or tot lots to large community and county parks and nature areas. The state program is financed by a percentage of the state's Real Estate Transfer Tax. The federal program is financed nationally by revenue from OSOD leases. Under both programs, funding assistance up to 50% of approved project costs can be obtained. Grant awards up to \$750,000 are available for acquisition projects, while development/renovation projects are limited to a \$400,000 grant maximum. Written applications must be submitted to IDNR between May 1 and July 1 of each calendar year, with grant awards typically announced by December or January. Only those local government agencies having statutory authority to acquire and develop land for public park purposes are eligible to apply for and receive assistance under the OSLAD and LWCF grant programs. Applications are evaluated and prioritized for funding assistance based upon recreation priorities and criteria identified in the Department's Statewide Comprehensive Outdoor Recreation Plan (SCORP). Lands acquired with OSLAD or LWCF funds are required to be operated and maintained in perpetuity for public outdoor recreation. Examples of eligible projects include:

- Acquisition of land for new park sites or park expansion, water frontage, nature study, and natural resource preservation
- Development/Renovation of:
 - picnic and playground facilities;
 - outdoor nature interpretive facilities;
 - sports courts and play fields;
 - swimming pools, beaches and bathhouses;
 - campgrounds and fishing piers;
 - winter sports facilities;
 - park roads and paths, parking, utilities and restrooms; and
 - architectural/engineering (A/E) services necessary for proper design and construction of approved project components.

<http://www.dnr.state.il.us/ocd/newoslad1.htm>

The Park and Recreational Facility Construction Act (PARC) was created by Public Act 096-0820 effective November 18, 2009 to provide grants to be disbursed by the DNR to eligible local governments for park and recreation unit construction projects. Park or recreation unit construction project means the acquisition, development, construction, reconstruction, rehabilitation, improvements, architectural planning, and installation of capital facilities consisting, but not limited to, buildings, structures, and land for park and recreation purposes and open spaces and natural areas.

Who may apply for the grants? Eligibility requirements mirror the OSLAD grant program. Units of local government that are authorized by Illinois law to expend public funds for the acquisition and development of land for public indoor/outdoor park, recreation or conservation purposes are eligible to apply for funding assistance.

What types of projects are eligible for grants?

- “Bondable” or “brick and mortar” projects for capital expenditures may include, but are not limited to:
 - demolition in preparation for additional indoor/outdoor recreation purposes,
 - site preparation and improvements for indoor/outdoor recreation purposes,
 - utility work for indoor/outdoor recreation purposes,
 - reconstruction or improvement of existing buildings or facilities for indoor/outdoor recreation purposes,
 - expansion of buildings/facilities for indoor/outdoor recreation purposes, and
 - new construction of buildings/structures.
- Land acquisition projects for public park recreation and conservation purposes include, but are not limited to:
 - acquisition of land for the following:
 - to construct new public indoor/outdoor recreation buildings, structures and facilities;
 - to expand existing public indoor/outdoor recreation buildings, structures and facilities;
 - general park purposes such as regional, community and neighborhood parks and playfields;
 - frontage on public surface waters for recreation use;

- open space/conservation purposes to protect floodplains, wetlands, natural areas, wildlife habitat and unique geologic and biologic features, and
- additions to such areas.

All properties acquired with PARC assistance are required to have a covenant placed on the deed at the time of the recording that stipulates the property must be used, in perpetuity, solely for indoor/outdoor recreation purposes. There is no limit on the number of applications one agency may submit per grant cycle. The DNR may limit any one single project to a maximum of no more than 10% of the amount released for any fiscal year. Of the total amount of PARC projects awarded statewide, 20% shall be awarded to the Chicago Park District, provided that the Chicago Park District complies with the provisions of State law and PARC rules, and 80% shall be awarded to local government units outside of the City of Chicago. The PARC program shall operate on a reimbursement basis providing up to the following maximum percentages for funding assistance: the State will provide up to 75% of approved project costs, with the exception of those local governments defined as “disadvantaged”, which will be eligible for up to 90% funding. The primary priorities for evaluating PARC projects include, but are not limited to, the following criteria:

- useful life of existing facilities and improvements in comparison to the Department’s schedule of Useful Life of Parks and Recreation Facilities;
- address public health and safety needs;
- sponsor has high economic need;
- correct accessibility deficiencies as defined by the Americans With Disability Act;
- projects that provide the greatest benefit in terms of cost per capita within the applicant’s jurisdictional boundaries; and
- land acquisition.

Opening date for requests and deadline for applications are October 15, 2010 to November 29, 2010.

<http://dnr.state.il.us/ocd/newPARC1.htm>

The purpose of the *Urban and Community Forestry Assistance Grant* is to provide financial assistance to local units of government for the development of local urban and community forestry programs. These activities must help to establish, manage, conserve and preserve the urban and community forests from inner city to associated public lands.

Eligibility:

- Local unit of government or a co-application between a local unit of government and a not-for-profit defined by the General Not-For-Profit Corporation Act of 1986.
- The applicant must have an approved tree care ordinance or equivalent or must use Application A to ask for funding to create a tree care ordinance. The ordinance must accomplish the following:
 - establishes tree authority,
 - specifies duties and responsibilities of Tree Authority,
 - specifies the number of members and their qualifications,
 - identifies the need and importance of local urban forestry programs,
 - identifies tree planting and tree care standards, and
 - contains the provisions for hazard and diseased trees from private property.

By law, the program is set up as a 50/50 cost share reimbursement, with no more than 5% of the total funds available to one unit of government. Eligible Core Local Urban Forestry Program Projects include:

- tree care ordinances,
- tree board establishment,
- tree inventories,
- tree preservation ordinances,
- comprehensive urban forestry management plans,
- forest insect and disease mitigation plans,
- residual wood utilization,
- public education on urban forestry,
- training of city staff on tree care,
- tree planting/beatification,
- tree care demonstrations beyond routine maintenance,
- Tree and Utility Conflict Resolution, and
- Tree preservation/tree protection demonstration sites.

<http://www.dnr.state.il.us/orc/Urbanforestry/financialasst.html>

The Illinois Bicycle Path Grant Program was created in 1990 to financially assist eligible units of government to acquire, construct, and rehabilitate public, non-motorized bicycle paths and directly related support facilities. Grants are available to any local government agency having statutory authority to acquire and develop

land for public bicycle path purposes. Financial assistance up to 50% of approved project costs is available through the program. Maximum grant awards for development projects are limited to \$200,000 per annual request; no maximum exists for acquisition projects. Revenue for the program comes from a percentage of vehicle title fees collected pursuant to Section 3-821(f) of the Illinois vehicle code. Applications for grant assistance must be received by IDNR by March 1 of each calendar year. Applications are evaluated on a competitive basis according to criteria set by the Department. Grant awards are generally announced within six months following the application deadline date. Eligible project costs include:

- Linear corridor land acquisition costs, including associated appraisal fees; and
- Bicycle path development or renovation including site clearing and grading, drainage, surfacing, bridging, fencing, signage, and directly related support facilities such as potable water and restroom facilities.

<http://www.dnr.state.il.us/ocd/newbike2.htm>

The Boat Access Area Development Program provides financial assistance to local government agencies for the acquisition, construction, and expansion/rehabilitation, including necessary A/E services, of public boat and canoe access areas on Illinois' lakes and rivers. The program provides up to 100% of approved project construction costs and 90% of approved land acquisition costs. Grant awards are limited to a \$200,000 annual maximum per project.

<http://www.dnr.state.il.us/ocd/newboat2.htm>

The Recreational Trails Program (RTP) provides funds to the States to develop and maintain recreational trails and trail-related facilities for both nonmotorized and motorized recreational trail uses. The RTP is an assistance program of the Department of Transportation's Federal Highway Administration (FHWA). [Federal transportation funds benefit recreation](#) including hiking, bicycling, in-line skating, equestrian use, cross-country skiing, snowmobiling, off-road motorcycling, all-terrain vehicle riding, four-wheel driving, or using other off-road motorized vehicles. The RTP funds come from the Federal Highway Trust Fund, and represent a portion of the motor fuel excise tax collected from nonhighway recreational fuel use: fuel used for off-highway recreation by snowmobiles, all-terrain vehicles, off-highway motorcycles, and off-highway light trucks. The RTP funds are distributed to the States by legislative formula: half of the funds are distributed equally among all States, and half are distributed in proportion to the estimated amount of nonhighway recreational fuel use in each State. See the [Funding Levels by State](#). Each State administers its own program. [Contact your](#)

[State RTP Administrator](#) for guidance on State policies and project eligibility requirements. The [Recreational Trails Program Project Database](#) lists most RTP projects funded from 1993 through 2009. The Coalition for Recreational Trails compiled this database from information supplied by State trail administrators.

Illinois Environmental Protection Agency

319 Grants are available to local units of government and other organizations to protect water quality in Illinois. Projects must address water quality issues relating directly to nonpoint source pollution. Funds can be used for the implementation of watershed management plans including the development of information/ education programs and for the installation of best management practices. Illinois EPA receives these funds through Section 319(h) of the Clean Water Act and administers the program within Illinois. The maximum federal funding available is 60 percent. The program period is two years unless otherwise approved. This is a reimbursement program. Applications are accepted June 1 through August 1.

<http://www.epa.state.il.us/water/financial-assistance/non-point.html>

The Illinois Green Infrastructure Grant Program for Stormwater Management (IGIG) has grants available to local units of government and other organizations to implement green infrastructure best management practices to control stormwater runoff for water quality protection in Illinois. Projects must be located within a Municipal Separate Storm Sewer System (MS4) or Combined Sewer Overflow (CSO) area. Funds are limited to the implementation of projects to install best management practices (BMPs).

www.epa.state.il.us/water/financial-assistance/igig.html

The American Recovery and Reinvestment Act of 2009 provides significant funding for states to finance high priority infrastructure projects needed to ensure clean water and safe drinking water. *The Clean Water State Revolving Fund* program, in place since 1987, received \$4 billion, including funds for Water Quality Management Planning Grants. The Drinking Water State Revolving Fund program, in place since 1997, received \$2 billion. EPA is making Recovery Act grants to states and Puerto Rico to capitalize their State Revolving Fund (SRF) programs, from which assistance is provided to finance eligible high priority water infrastructure projects. The states will set priorities based on public health and environmental factors, in addition to readiness to proceed to construction, and identify which projects will receive funding. States must provide at least 20% of

their grants for green projects, including green infrastructure, energy or water efficiency, and environmentally innovative activities.

http://water.epa.gov/infrastructure/infrafin/cwdwsrf_index.cfm

Green Infrastructure

Active Transportation Alliance

The Complete Streets, Complete Networks: A Manual for Design of Active Transportation includes a chapter on Green Infrastructure that recognizes the importance of street trees and landscaping to enhance “the comfort and safety of people who live and travel along the street.

<http://www.atpolicy.org/Design>

American Planning Association

The Planning Advisory Service has developed *Green Infrastructure: A Landscape Approach* Report # 571 by David C. Rouse, AICP and Ignacio F. Bunster-Ossa and is available from the APA.

<http://www.planning.org/pas/reports/chronlist.htm>

American Society of Landscape Architects

Features green infrastructure-related resources, including case studies, articles, books, websites and funding sources.

<http://www.asla.org/ContentDetail.aspx?id=24076>

Aurora Green Infrastructure Implementation Project

The City of Aurora Green Infrastructure Implementation Project is located in the McCarty Burlington Neighborhood Planning Area on the near northeast side of the city.

<http://www.aurora-il.org/green/infrastructure/>

Chicago Wilderness Greening Infrastructure Initiative

Communities, land-use planners, and conservation professionals use the Chicago Wilderness Green Infrastructure Vision (GIV) to inform their land-use planning. The GIV identifies 1.8 million acres that can be restored, protected, or connected through conservation and thoughtful, sustainable development practices. The GIV guides the protection and development of an accessible, interconnected network of healthy ecosystems that contribute to economic vitality and quality of life for

all the region's residents. <http://www.chicagowilderness.org/what-we-do/protecting-green-infrastructure/>

Center for Neighborhood Technology

The *National Green Values™ Calculator* is a tool for quickly comparing the performance, costs, and benefits of Green Infrastructure, or Low Impact Development (LID), to conventional stormwater practices.

<http://greenvalues.cnt.org/national/calculator.php>

Conservation Fund

Features green infrastructure-related resources, including case studies, articles, books, websites and funding sources.

<http://www.conservationfund.org/our-conservation-strategy/focus-areas/green-infrastructure/>

Elgin's Lord Street Basin CSO Retrofit Project

Add link when available

Green Infrastructure: A Landscape Approach

by David C. rouse, AICP and Ignacio F. Bunster-Ossa

The authors present six principles for successful green infrastructure projects.

<http://www.amazon.com/Green-Infrastructure-A-Landscape-Approach/dp/161190062X>

Green Infrastructure in the Village of Campton Hills

Documents and organizes the planning-level natural resource data in Campton Hills to create a map of community or regional scale green infrastructure.

http://www.villageofcamptonhills.org/Joint%20ERMC/VCH_GreenINF_RptFINAL_all_maps.pdf

Green Infrastructure, Linking Landscapes and Communities

by Mark A. Benedict and Edward T. McMahon

Includes illustrative and detailed examples from throughout the country.

<http://www.amazon.com/Green-Infrastructure-Linking-Landscapes-Communities/dp/1559635584>

Green Infrastructure: Smart Conservation for the 21st Century

by Mark A. Benedict, Ph.D. and Edward T. McMahon, J.D.

This monograph is derived from Modules 2 and 4 of the Participants Manual for the May 2001 pilot offering of the Conservation Leadership Network course, *Green Infrastructure: A Strategic Approach to Land Conservation*.

<http://www.sactree.org/assets/files/greenprint/toolkit/b/greenInfrastructure.pdf>

Growing Greener Cities

Edited by Eugenie L. Birch and Susan M. Wachter

Growing Greener Cities offers an overview of the urban green movement, case studies in effective policy implementation, and tools for measuring and managing success.

<http://www.upenn.edu/pennpress/book/14506.html>

Maryland Green Infrastructure Assessment

A tool developed to help identify and prioritize those areas of greatest statewide ecological importance, as well as those at greatest risk of loss to development. It identifies large contiguous blocks of natural land (hubs), interconnected by corridors to allow animal and plant propagate dispersal and migration.

<http://www.dnr.state.md.us/greenways/gi/gi.html>

Morton Arboretum Regional Trees Initiative

The Morton Arboretum is leading the development and implementation of a strategy to improve the vitality and sustainability of the region's trees.

<http://www.mortonarb.org/our-impact/regional-trees-initiative.html>

Natural Resource Conservation Service (NRCS)

The NRCS offers the *NRCS Native Plant Guide* and *Rain Garden information - Iowa NRCS (includes Spanish fact sheet)*.

<http://www.will-scookswcd.org/publications-resources-links.php>

New York State Department of Environmental Conservation

The New York State Department of Environmental Conservation's *Hudson River Estuary Program* has compiled a list of stormwater management projects in the Hudson River Valley that use green infrastructure. These are posted online as a web-based resource, and you can browse examples by practice type or location. Each example includes details on the project, including the type of site, materials used, maintenance, costs, etc

<http://www.dec.ny.gov/lands/58930.html>

Serosun Farms

Serosun Farms is a sustainable community centered around a working farm in the northwestern part of Kane County.

<http://www.serosunfarms.com/home/>

The Conservation Foundation

The Conservation Foundation formed the *Conservation@Home* program to encourage and recognize property owners that protect and/or create yards that are environmentally friendly and conserve water. Whether you are starting from a grass lawn or have existing natural areas, the Conservation@Home program can help you make your yard more attractive to wildlife and retain precious rainwater by planting [native vegetation](#), creating [butterfly and rain gardens](#), using [rain barrels](#) and removing exotic species of plants.

<http://www.theconservationfoundation.org/conservation--home.html>

The Northeastern Illinois Regional Greenways and Trails Plan

The Northeastern Illinois Regional Greenways and Trails Plan presents a vision for a regional greenway and trail network to advance greenway preservation and reduce conflicts with other development activities.

<http://www.cmap.illinois.gov/documents/20583/d26c955c-bc64-4234-a63c-5aee08ebdbef>

The Northeastern Illinois Water Trails Plan

A plan that increases and coordinates access to the region’s waterways for canoes and kayaks.

[http://www.openlands.org/filebin/images/plans_reports/Greenways_Projects_Northeastern Illinois Regional Water Trails Plan.pdf](http://www.openlands.org/filebin/images/plans_reports/Greenways_Projects_Northeastern_Illinois_Regional_Water_Trails_Plan.pdf)

US Environmental Protection Agency (USEPA)

EPA's *Office of Water* reorganized and compiled information into a single green infrastructure site which includes tools, case studies, policy documents and contacts.

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

Municipal Handbook: Managing Wet Weather with Green Infrastructure Handbook Series is a series of documents to help local officials implement green infrastructure in their communities. Handbook topics cover issues such as financing, operation and maintenance, incentives, designs, codes & ordinances,

and a variety of other subjects. The handbook documents are intended to serve as "how to" manuals on these topics, written primarily from the standpoint of municipal implementation. The series includes the "Water Quality Scorecard" handbook, 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. Green infrastructure applications and approaches can reduce, capture, and treat stormwater runoff at its source before it can reach the sewer system. Site-specific practices, such as green roofs, downspout disconnections, rain harvesting/gardens, planter boxes, and permeable pavement are designed to mimic natural hydrologic functions and decrease the amount of impervious area and stormwater runoff from individual sites. The applications and design approaches can also be applied in neighborhood settings (i.e., green streets) or at larger regional scale (i.e., riparian buffers and urban forestry) to manage stormwater. These applications and approaches can keep stormwater out of the sewer system to reduce overflows and to reduce the amount of untreated stormwater discharging to surface waters. http://water.epa.gov/infrastructure/greeninfrastructure/gi_policy.cfm

The US EPA's *National Stormwater Calculator* is a desktop application that estimates the annual amount of rainwater and frequency of runoff from a specific site anywhere in the United States. Estimates are based on local soil conditions, land cover, and historic rainfall records. It is designed to be used by anyone interested in reducing runoff from a property, including

- site developers,
- landscape architects,
- urban planners, and
- homeowners.

The Calculator accesses several national databases that provide soil, topography, rainfall, and evaporation information for the chosen site. The user supplies information about the site's land cover and selects the types of low impact development (LID) controls they would like to use. The LID controls that the user can choose are seven green infrastructure practices:

1. Disconnection
2. Rain harvesting
3. Rain gardens
4. Green roofs
5. Street planters
6. Infiltration basins
7. Porous pavement

The stormwater calculator (SWC), like any model, estimates an outcome based on available information such as soil type, landscape and land-use information, and historical weather. These estimates can be affected by limitations on site-specific information and uncertainties about future climate. To better inform decisions, it is recommended that the user develop a range of results with various assumptions about model inputs such as percent of impervious surface, soil type, and sizing of green infrastructure. An update to the SWC, which will include the ability to link to several future climate scenarios, will be released by the end of 2013. Climate projections indicate that heavy precipitation events are very likely to become more frequent as the climate changes. Green Infrastructure can increase the resiliency of stormwater management approaches to a changing climate, and this update will allow users to consider how runoff may vary based both on historical weather and potential future climate. Please check with local authorities about whether and how use of these tools may support local stormwater management goals and requirements.

<http://www.epa.gov/nrmrl/wswrd/wq/models/swc/>

Wisconsin DNR and Extension

The Wisconsin Department of Natural Resources invites you to help clean up our waters by building your own rain garden with [Rain gardens: a how-to manual \[PDF\]](#) and [How to build a rain garden \[exit DNR\]](#).

<http://dnr.wi.gov/topic/Stormwater/raingarden/>

Local Government

Campton Township Open Space

The Township has preserved over 1000 acres of land. Under the Open Space Plan, areas of the township like [Corron Farm](#), the [Headwaters Conservation Area](#), Gray Willows Farm, and [Poynor Park](#) will be available to our residents for generations to come.

http://www.camptontownship.com/main/Parks_Open_Space/open_space_parks_main_frame.htm

City of Elgin Sustainability Action Plan

The Green Infrastructure working group has addressed opportunities for recreation, while at the same time protecting and enhancing the regional waterways, expanding native plantings and wildlife areas, as well as improving the overall livability of the city of Elgin.

<http://www.cityofelgin.org/DocumentCenter/Home/View/13129>

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Dundee Township Open Space Planning

In addition to other basic functions, Dundee Township operates and maintains an 860 acre open space program. Voters established the Township Open Space Program in 1997 and purchased those 860 acres of open space.

<http://www.dundee township.org/index.php?m=2&s=13>

Forest Preserve District of Kane County

<http://www.kaneforest.com/>

Kane County 2040 Plan

The 2040 Plan is part of the Quality of Kane initiative. It responds to the challenges that need to be addressed and integrates the planning efforts for land use, transportation and health. The Plan includes a chapter including Objectives and Policies on Open Space and Green Infrastructure.

<http://www.countyofkane.org/Documents/Quality%20of%20Kane/2040%20Plan/default.htm>

Kane County Bicycle and Pedestrian Plan

The planning area for the Bicycle and Pedestrian Plan coincides with the political boundaries of the Kane/Kendall Council of Mayors. This area includes all of Kane and Kendall Counties, along with portions of Elgin in Cook County, and portions of Aurora in DuPage County.

http://kdot.countyofkane.org/Planning%20Documents/Bicycle%20Planning/biped_plan.pdf

Kane County Stormwater Ordinance

Meant to regulate stormwater management and govern the location, width, course, and release rate of all stormwater runoff channels, streams, and basins in the County, in accordance with the Kane County Comprehensive Countywide Stormwater Management Plan.

<http://www.countyofkane.org/FDER/Documents/waterOrdinances/adoptedOrdinance.pdf>

Watersheds

Blackberry Creek

<http://foxriverecosystem.org/blackberry.htm>

Ferson-Otter Creek

http://foxriverecosystem.org/ferson_otter.htm

Fox River Ecosystem Partnership

<http://foxriverecosystem.org/index.htm>

Jelkes Creek Fox River Watershed Coalition

<http://kanedupageswcd.org/jelkes-creek.htm>

Kishwaukee River Ecosystem Partnership

http://krep.bios.niu.edu/index_files/Page348.htm

Poplar Creek Watershed Action Plan

<http://www.cmap.illinois.gov/documents/20583/2862f49e-d41e-42d5-97f2-a376d77942e6>

Spring Creek Watershed Partnership

<http://www.springcreekwatershed.info/>

Tyler Creek Watershed

http://foxriverecosystem.org/tyler_creek.htm

Woods Creek Watershed Study and Plan

<http://www.algonquin.org/egov/docs/1318436787483.htm>