Green Infrastructure Vision



Green Infrastructure Vision Study and Report

Drafted by:

The City of Crystal Lake
Planning and Economic Development Department
And
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With assistance from :

Environmental Defenders of McHenry County
Fox River Study Group
Illinois Nature Preserves Commission
McHenry County Conservation District
Openlands
The Land Conservancy

Adopted:

February 2012

Introduction and Purpose

The Green Infrastructure Vision was drafted to be a stand alone document providing background and broad based guidance for the City's Green Infrastructure chapter within the Comprehensive Plan. The Green Infrastructure Vision is important as it identifies the green resources and possible site strategies located within the City. The 2030 Comprehensive Land Use Plan Green Infrastructure chapter takes it another step further and identifies a goal and specific actions and success indicators for each of the resource areas and site strategies. The Green Infrastructure Vision and Green Infrastructure chapter work together to provide a wealth of information on the City's natural features and future actions that can maintain these features and adopt new site strategies.

Green infrastructure can be defined in two primary ways and both are important to understand the complete green infrastructure vision. The term can be used to identify a greener, more environmentally sustainable version of typical gray infrastructure; for example, permeable pavement for parking lots or roadways or a natural bio-swale versus a drainage pipe. In this context, green infrastructure describes products, technologies, and practices that use natural systems that mimic natural processes—to enhance overall environmental quality and provide utility services. In addition to effectively retaining and infiltrating rainfall, these technologies can also filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon.

Green infrastructure can also be the identification, protection and interconnection of open space, including natural and human-altered landscapes. The Conservation Fund, a national authority on this topic, defines green infrastructure as "strategically planned and managed networks of natural lands, working landscapes and other open spaces that conserve ecosystem values and functions and provide associated benefits to human populations." (Benedict, Mark, and Edward McMahon. Green Infrastructure Linking Landscapes and Communities. Washington DC, Island Press, 2006). The foundation of green infrastructure networks is the natural elements—woodlands, wetlands, rivers, grasslands, agricultural lands, trails, recreational area and cultural and historic sites—that work together as a whole to sustain ecological values and functions.

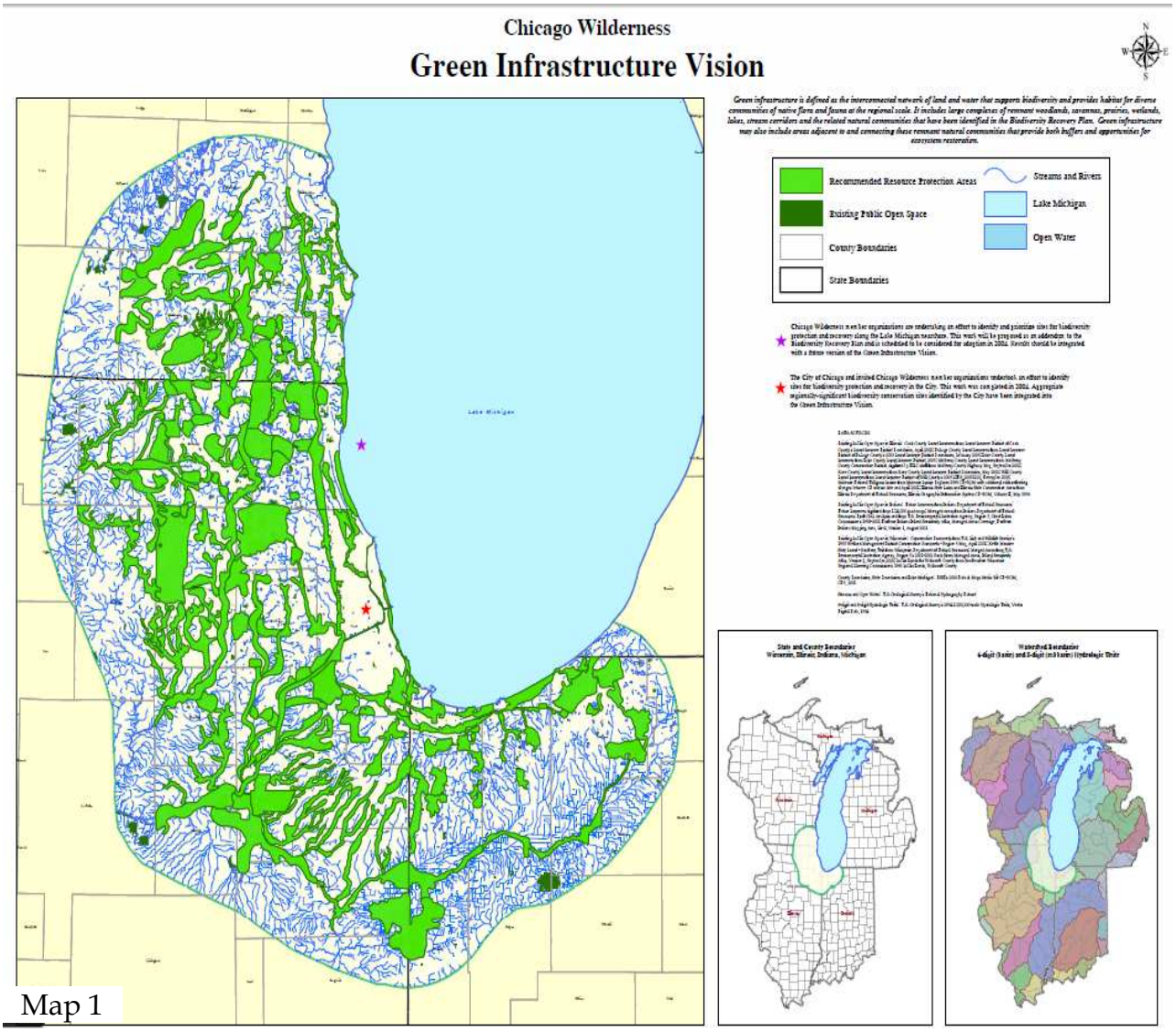
Regional Context

Crystal Lake is located in northeastern Illinois, 45 miles west of Chicago, 45 miles east of Rockford and 20 miles south of the Illinois/Wisconsin border. The City is situated in McHenry County which is fortunate to have numerous natural areas. These natural areas have been identified by many local agencies within the Chicago Metropolitan Area that have created informational pieces, maps, specific resource protection plans and green infrastructure plans that include the areas.

Locally, Chicago Wilderness, a regional consortium of over 250 conservation organizations and public agencies (including the Crystal Lake Park District and the McHenry County Conservation District), has adopted a regional Green Infrastructure Vision (GIV). The GIV is based on a regional network of open space and developed areas that preserve and enhance biodiversity, wildlife habitat and critical natural resources.

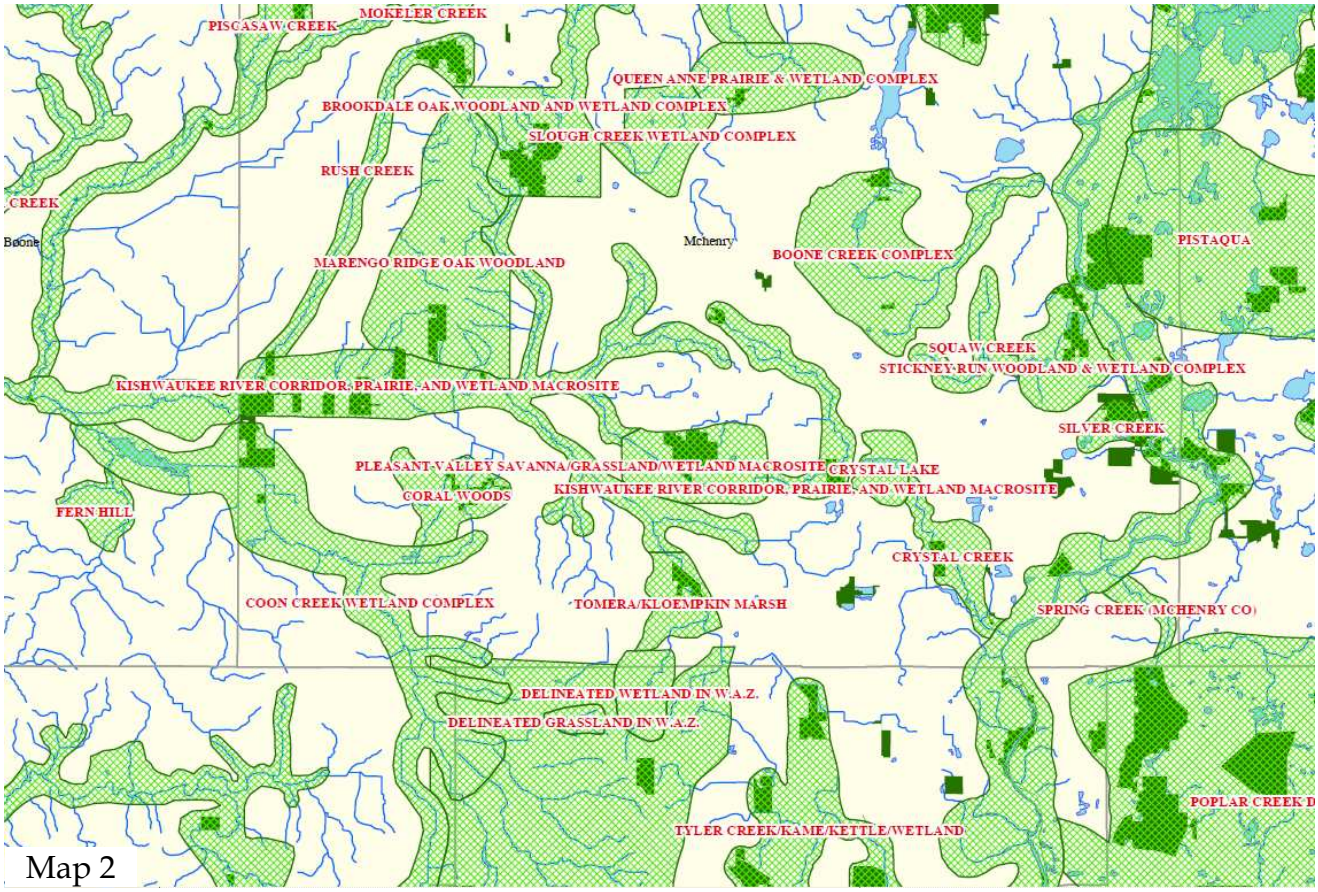
The various green infrastructure elements in Crystal Lake are integral parts of a larger regional system of green infrastructure. The previously referenced (GIV) developed by the Chicago Wilderness consortium maps a regional framework of 1.8 million acres of "resource protection areas". See Map 1 below. While the Vision's recommendations include a continued emphasis on natural land acquisition by open space agencies, such as the McHenry County Conservation District, there is a clear recognition that effective green infrastructure protection will require a range of integrated strategies. These strategies include:

* Acquisition by public agencies;
* Conservation easements on private land;
* Conservation development;
* Greenway connections;
* Landscape retrofitting of previously developed land (e.g., installing practices such as rain gardens and natural landscaping);
* Ecological restoration of degraded landscapes;
* Farmland protection.



Map 1

In the vicinity of Crystal Lake, the GIV identified, mapped and described several important resource protection opportunities. These included: the upper Kishwaukee River corridor, Crystal Lake, Crystal Creek, Squaw Creek, and Silver Creek. See Map 2 below. In the GIV it is recommended that local governments consider the regional mapping and tailor and expand it based on a more refined consideration of local opportunities and priorities.



Map 2

Another important regional reference is the *Northeastern Illinois Regional Greenways and Trails Plan*. See Map 3 on the following page. This plan was prepared by regional planners with the guidance of numerous local government and park district officials. The regional map shows a network of existing and proposed regional trails and greenways that literally surround Crystal Lake. Most notable is the very popular McHenry County/MCCD Prairie Trail that runs the length of the City.

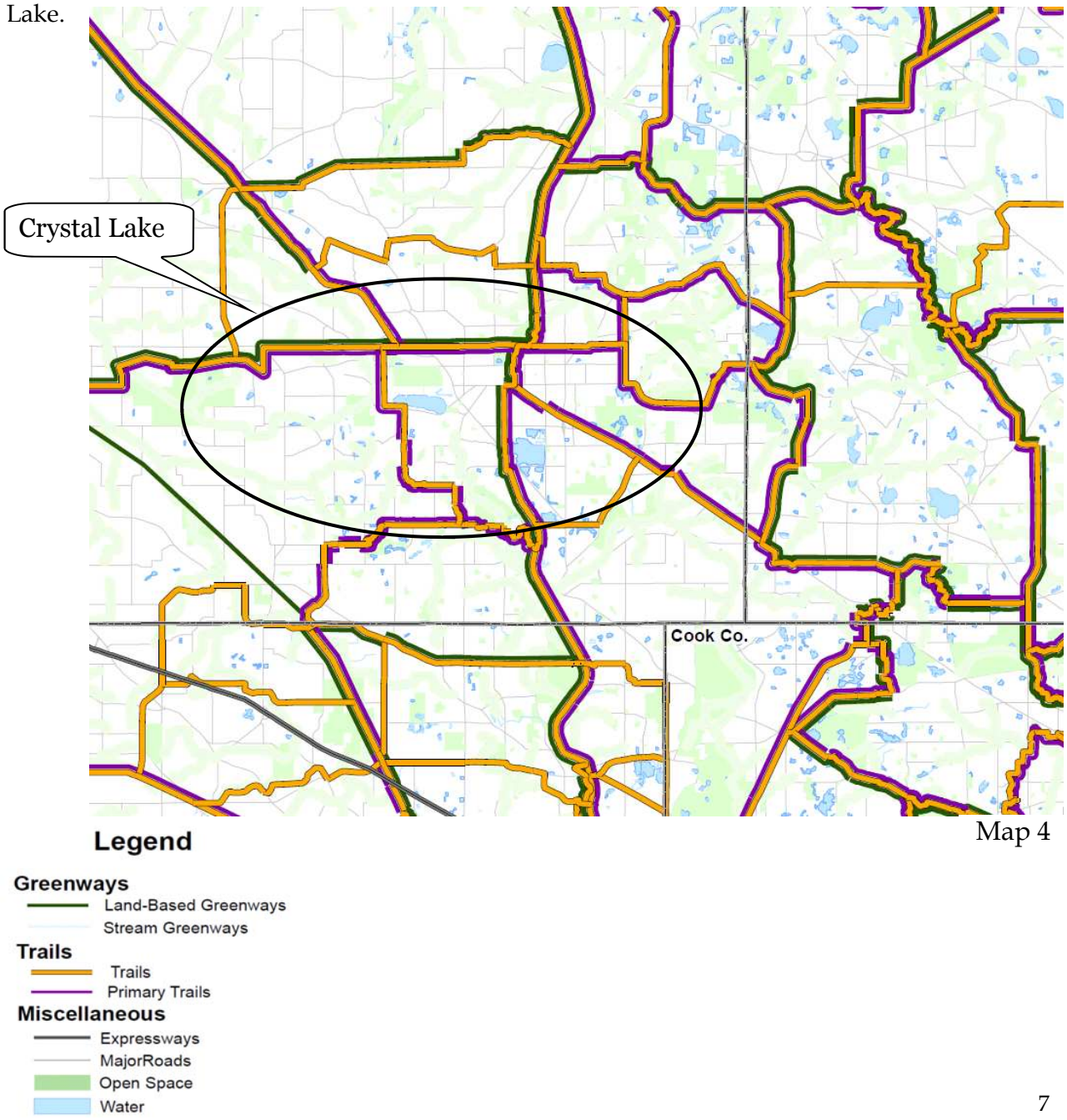

Northeastern Illinois Regional Greenways & Trails Plan -- 2009 Update
Wisconsin
Crystal Lake
Lake
Michigan
Indiana
Legend
Greenways
Land-Based Greenways
Stream Greenways
Trails
Trails
Primary Trails
Miscellaneous
Expressways
MajorRoads
Open Space
Water
CMAP Planning Area
This map represents the greenway and trail elements of the Northeastern Illinois Regional Greenways and Trails Plan - 2009 Update, adopted by the MPD Policy Committee on October 8, 2009 and by the Board of CMAP on October 14th, 2009. A map to be printed at the end of 2009 will differentiate between proposed and existing trails and will include information on data sources.
October, 2009
Chicago Metropolitan Agency for Planning

Map 3

As part of the Northern Illinois Regional Greenways and Trails Plan, drafted by CMAP, surveys sent to McHenry County identified the following trails as top priorities:

* Completion of the Stone Mill Trail Extension
* Completion of the current phase of the Crystal Lake to Woodstock Trail Project
* Hebron to Harvard Trail Concept
* Kishwaukee River Trail Concept
* McHenry County College to Route 47 Trail Concept
* Rakow Road to Prairie Trail Connector Concept

Three of these top priorities are within the City limits. The map below illustrates the various greenways and trail systems as they connect around the immediate region and tie into Crystal Lake.



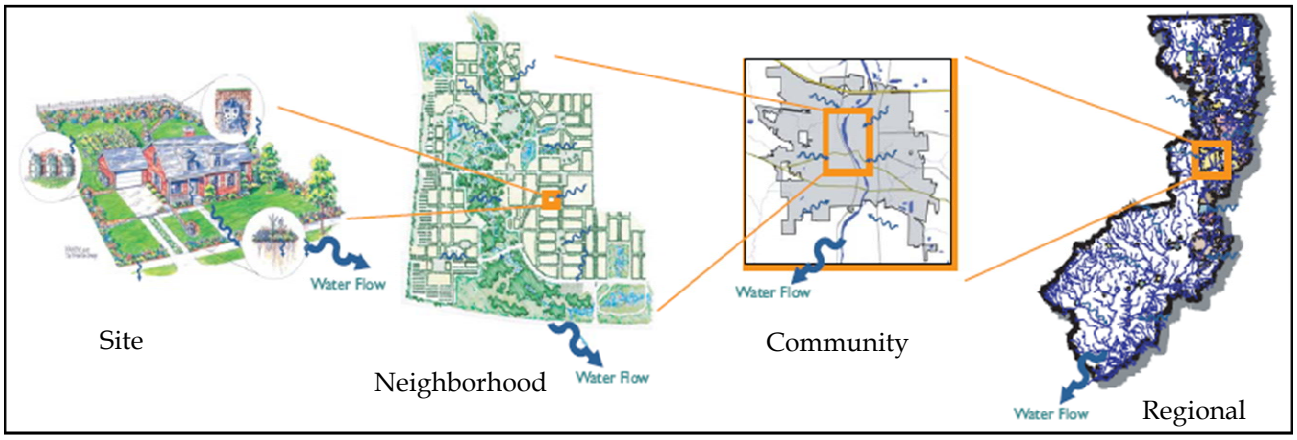
Map 4

The benefits of for green infrastructure have become apparent in recent years with frequent observations that typical gray infrastructure and associated sprawl development may not be environmentally or economically sustainable. In contrast, green infrastructure provides a compelling alternative to community development, redevelopment, and infrastructure investment. Some of the relevant benefits of green infrastructure include:

* reduced flooding
* increased water resources through conservation
* improved water quality and hydrology
* enhanced groundwater recharge
* wildlife habitat and biodiversity
* reduced infrastructure costs
* neighborhood and trail connectivity
* enhanced quality of life
* improved sense of place and community identity

Implementing Green Infrastructure in Crystal Lake

The key to effective implementation of green infrastructure is to look for opportunities at many spatial scales. As highlighted in the graphic below, green infrastructure can be implemented at multiple levels: regional, community, neighborhood, and site. Relevant opportunities are specifically detailed.



Sites: Small sites, which include residential properties, school grounds, businesses, and parks can incorporate a variety of green infrastructure techniques. These include:

* green roofs
* permeable paving
* bio-swale
* rain gardens
* natural landscaping and preservation of native trees and habitats
* water cisterns
* naturalized stormwater detention
* preservation easements (trees, landscape, etc.)

These can be stand alone or connected on site or with other sites.

Neighborhood: Neighborhoods, both existing and new, can be transformed by incorporating conservation design principles. Specifically, neighborhood design can incorporate open space protection, natural landscaping, and stormwater best management practices to preserve biodiversity, natural resource functions, and water quality. New neighborhood design can easily incorporate these features and existing neighborhoods can be retrofitted even starting small by connecting individual site techniques. This conservation design approach brings nature closer to families and addresses the growing concerns over "nature deficit disorder". Further described below, the city already has made significant strides in changing its policies and ordinances to encourage and require green infrastructure approaches at the neighborhood scale, principally for new development.

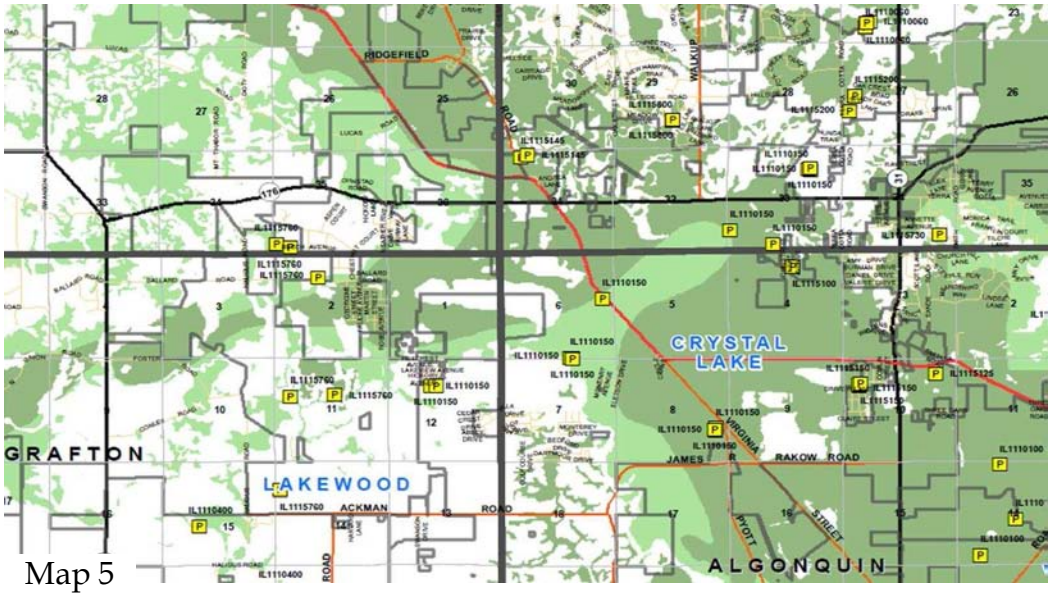
Community: At the community level, green infrastructure principles and policies can be incorporated into municipal, county, and park district land use plans and ordinances. The GIV also can influence land acquisition priorities of local park and open space agencies. Crystal Lake has already made significant strides in this area. In addition to incorporating green infrastructure as a central element and policy basis for this Plan, the City can claim several other accomplishments.

* In 2007 the city adopted the Crystal Lake Watershed Design Manual that includes recommendations and design criteria for best management practices to help preserve the water quality and hydrology of its namesake lake.
* In 2008 the City adopted the Northwest Sub-Area Plan that includes various sustainable development strategies for potential growth areas in its northwest area. In particular, the plan identifies techniques such as cluster development, stream buffers, transit oriented development, and transfer of development rights. This plan is now incorporated into the 2030 Comprehensive Land Use Plan.
* The Unified Development Ordinance adopted in 2009 introduced requirements for conservation development on properties that meet certain environmental triggers. It provides alternative standards for roadway and subdivision design that incorporate green infrastructure principles.

While these are important accomplishments, additional opportunities exist to strengthen the policy and technical basis for green infrastructure in Crystal Lake.

Regional: The regional scale looks at green infrastructure elements as they travel through surrounding metropolitan areas and make connections between them. Regional paths benefit large groups of people, bridge gaps between green infrastructure elements and link more people to natural areas. The previously referenced Chicago Wilderness Green Infrastructure Vision has mapped an interconnected network of recommended "resource protection areas" in a region that encompasses northeastern Illinois, as well as, parts of Wisconsin and Indiana. Chicago Wilderness has successfully engaged CMAP and other regional planning commissions to incorporate the GIV into new regional land use plans. Crystal Lake also referenced the CMAP Northern Illinois Greenways and Trails Plan and Go To 2040 Comprehensive Regional Plan. Crystal Lake is a pioneering municipality in its action to recognize these regional plans and tailor its principles to the unique local landscape and natural resources.

Crystal Lake is fortunate to have an abundance of natural resources. Like other areas of McHenry County, its rolling landscape reflects the activity of glaciers over 10,000 years ago. One fortuitous product of the glaciers is Crystal Lake's namesake lake, one of the best examples of clear, high quality natural lakes in the entire region. The glaciers also left behind thick deposits of sand and gravel under much of the city, providing both an important economic resource for mining as well as abundant groundwater aquifers. While these aquifers are valuable resources, they also are relatively susceptible to aquifer contamination as indicated by mapping that shows much of the city as a sensitive aquifer recharge area (SARA).



Map 5

Working together, the stakeholders and city staff evaluated the natural resource and open space maps and identified some unique resources and opportunities in the Crystal Lake planning area. This process used the green infrastructure planning principles of Chicago Wilderness which emphasized the protection of large, biologically diverse sites that are interconnected regionally and are also buffered from potentially conflicting land uses. The process also was influenced by national green infrastructure planning principles. In particular, *Green Infrastructure: Linking Landscape and Communities*, (Benedict, Mark, and Edward McMahon. Green Infrastructure Linking Landscapes and Communities. Washington DC, Island Press, 2006) identifies ten principles of green infrastructure planning that were used in this planning process:

* Connectivity is key.
* Context matters.
* Green infrastructure should be grounded in sound science and land-use planning theory and practice.
* Green infrastructure can and should function as the framework for conservation and development.
* Green infrastructure should be planned and protected *before* development.
* Green infrastructure is a critical public investment that should be funded up front.
* Green infrastructure affords benefits to nature and people.
* Green infrastructure respects the needs and desires of landowners and other stakeholders.
* Green infrastructure requires making connections to activities within and beyond the community.
* Green infrastructure requires long-term commitment.

Mapping a Green Infrastructure Network in Crystal Lake

Crystal Lake sits on relatively high ground that serves as the headwaters of several streams that eventually flow into the Kishwaukee River to the west and the Fox River to the east. Prior to European settlement, the Crystal Lake landscape was vegetated with a mixture of oak woods and savannas, prairies, and wetlands. While most of the original landscapes were converted to agricultural lands or developed into suburban uses, there is still evidence of some of these original landscapes. Examples are the stately second-growth oak and hickory woods in some residential neighborhoods as well as preserved natural areas such as Sternes Woods, Sternes Fen, Veteran's Acres, and Wingate Prairie. The city acknowledges these existing natural areas into the Green Infrastructure Vision to establish a long term goal for protection, preservation and enhancement.

To get a better understanding of the natural resource framework for this plan, detailed maps were collected and assembled. These maps reflected both the underlying natural resources, as well as protected open spaces, recreational areas, and trails.

The mapped natural resources included:

* Wetlands (including high quality ADID sites)
* Hydric soils (i.e., former wetlands that were drained)
* Lakes, streams, and other bodies of water
* Oak woodlands
* Pre-settlement vegetation
* McHenry County Natural Area Inventory (MCNAI) sites
* Sensitive aquifer recharge areas (SARA)
* Major field tiles
* Chicago Wilderness GIV resource protection areas
* Watershed boundaries

The open space and protected lands mapping included:

* McHenry County Conservation District holdings
* Park District and City open space
* Major bike paths
* Private open areas, such as golf courses

As individual elements these features do not depict a clear green infrastructure framework. However, by grouping them together into clusters and logical linkages, an overall system of green infrastructure begin to appear.

The City worked with a group of local stakeholders and natural resource experts were invited to work with staff and advise the Plan Commission. Organization participating included:

* Chicago Wilderness Corporate Council/Cowhey Gudmundson Leder, Ltd.
* Chicago Wilderness SWAT (Sustainable Watershed Action Team)
* Environmental Defenders of McHenry County
* Fox River Study Group
* Illinois Nature Preserves Commission

* McHenry County Conservation District
* Upper Kishwaukee River Watershed Committee
* Openlands Project
* The Land Conservancy of McHenry County

Green Infrastructure Elements

One of the most important principles that all of the stakeholders and staff agreed upon is that green infrastructure planning and protection should incorporate both traditional open space protection and acquisition strategies as well as complementary approaches such as conservation development and conservation easements applied to private land. With this direction, a hierarchy of green infrastructure protection and restoration opportunities was identified in the Crystal Lake planning area. These included both areas to be protected and strategies to be incorporated:

* Highly Important Resource Areas: These are major landscape-scale areas that are resource rich and/or critical to the ecological and environmental health and economic vitality of the City. These areas also help to define Crystal Lake's unique sense of place and community image.

* Secondary Resource Areas: These are areas within or between the major elements or resources that are not as important. Secondary elements provide links between the major elements to form a more complete green infrastructure vision.

* Neighborhood and Site Strategies: Neighborhood and Site Strategies are programs and actions that can be undertaken at a localized scale that enable the goals and opportunities of the major elements to be fully realized.

The following are the lists of the elements and under which category they belong.

Highly Important Resource Areas

* Crystal Lake Watershed
* Upper Kishwaukee River Corridor
* Sleepy Hollow Creek and Silver Creek Watersheds
* Northeast Fen and Oak Stands
* Three Oaks Recreational Area
* Crystal Creek

Crystal Lake Watershed

Characteristics:



The health and vitality of Crystal Lake is largely dependent on the quality and quantity of runoff from its 2,300 acre watershed which lies primarily north of the lake. Water arrives in the lake via surface runoff, drainage from field tiles and Cove Pond, and shallow groundwater aquifers. The quality of this water, and the maintenance of healthy groundwater "baseflows," (versus surface stormwater runoff) are important for habitat and for recreation. Crystal

Lake is maintained by both the City of Crystal Lake and the Village of Lakewood as a main recreational destination in the area. Boating, fishing and swimming are the main attractions of the lake itself while Lippold Park to the north offers a dog park, playgrounds, 24 ball fields, batting cages a skate park, disc golf and bike trails.

Goal:

The primary goal for this major element is to ensure the natural aquatic ecosystems are preserved and enhance the recreational amenities of the area. This can be achieved primarily by best management practices that are incorporated into new site designs or retrofitted into existing neighborhoods and developments.

Upper Kishwaukee River Watershed

Characteristics:



Ken Schumacher, Sport Fishing blog

The Upper Kishwaukee River flows 15 miles beginning from the headwaters at Route 14 to the intersection of Pleasant Valley and McCue Roads. Its watershed, which lies in western and northwestern sectors of the Crystal Lake planning area is 59 miles of primarily agricultural land use. The Chicago Metropolitan Agency for Planning (CMAP) in conjunction with the Kishwaukee River Ecosystem Partnership (KREP) prepared the Upper Kishwaukee River Watershed Plan in 2008. The plan studies some water quality and aquatic habitat problems related to wastewater treatment plant discharges and historical channelization. Historical records have identified sensitive fish species such as the Iowa Darter and Blacknose Dace in this watershed. In addition, the upper watershed is dotted with glacial potholes, wetlands, oak groves and savannas that offer great potential for restoration. The Kishwaukee River also has a recreational draw for kayakers, canoeists and hikers.

Goal:

The main goal for this watershed is to restore a healthy aquatic community and ensure the river remains a vital resource to the neighborhoods surrounding it. The Upper Kishwaukee River Watershed Plan recommends expanded preservation of the creek corridor and wetlands, habitat restoration and that conservation design approaches be utilized for new development.

Sleepy Hollow and Silver Creek Watersheds

Characteristics:



Sleepy Hollow Creek runs along the northeast side of the city limits and into the Village of Prairie Grove before entering the Fox River. It has a drainage area of approximately 19.86 square miles. Immediately to the south, Silver Creek flows east from Crystal Lake into Oakwood Hills before discharging to the Fox River. The watersheds of these two creeks, with a combined area of roughly 30 square miles, include the northern and eastern parts of the City, including much of the downtown area. These two creeks were recently selected by CMAP for the development of a joint watershed action plan to protect wa-

ter quality, restore water body impairments and protect groundwater. Each creek and the overall watersheds have several attributes, including ADID Wetlands, the Fel-Pro, Silver Creek and Hollows Conservation Areas, and animal habitat.

Goal:

Protection of the creek corridor and maintaining good water quality and healthy baseflows in the watershed vital for the health of these creeks and the drainage into the Fox River.

Northeast Fen and Oak Stands

Characteristics:



Along the northeastern border of the City from Veteran Acres Park to Barreville and Wright Roads is the Northeast Fen and Oak Stands system. This area is unique for its rolling to hilly landscapes, stands of oak hickory woods and savanna and rare fen type wetlands. This resource area contains two city park sites (Veteran Acres and Sterne's Woods and Fen), Wingate Prairie, an Illinois Nature Preserve, and several wetlands. Much of this area is identified in the McHenry County's Natural Area Inventory. Extending to the northeast from these identified areas are additional woods and wetlands, some of which are now occupied by low-density residential neighborhoods.

Goal:

Preservation of the natural features and expanding the use of the recreational amenities is the main goal for this area.

Three Oaks Recreation Area

Characteristics:



Three Oaks Recreation Area is the newest recreational destination within Crystal Lake. This 500+ acre site includes nearly 350 acres of high quality, groundwater fed lakes that were converted from gravel mines. The complex features a beach, spray park, restored natural landscapes and an internal trail system. From a biodiversity perspective, the site is well known by birders for attracting migrating songbirds and waterfowl. A diversity of fish and small mammals also make their homes within and around the lake. Three Oaks is connected to adjacent areas by the regional Prairie Trail and is bordered by a large gravel mining complex to the south. Three Oaks Recreation area contributes to the community character of Crystal Lake and is projected to become a regional destination.

Goal:

The main goal for this resource area is to maintain the recreational amenities and use them to spur redevelopment of the surrounding properties on Route 14 and Main Street.

Crystal Creek

Characteristics:



Crystal Creek is the natural discharge from Crystal Lake. It flows southeast through Lake In The Hills Fen Nature Preserve west of Pyott Road, eventually flowing into the Fox River. The most upstream reaches of the creek have been piped or channelized to allow for development and storm water discharge. The creek flows in a mostly natural, meandering channel east of Randall Road. Restoring the natural conditions of the creek corridor, "daylighting" it from underground culverts, and restoring natural hydrology and improved water quality is a priority for this area. The residential areas south of the lake have historically had water ponding issues, Crystal Creek is utilized as a storm sewer discharge. The discharge water needs to be cleaned before entering the creek.

Goal:

The installation of BMP's around the creek and more natural drainage solutions is the main goal for this area.

Each one of the Highly Important Resource Areas will be further explored within the Comprehensive Plan as per the recommendations within this plan.

Secondary Resource Areas

Secondary Resource Areas are elements that are important as connectors or may not create a sense of place. They are still important in the overall green infrastructure vision. The following elements have been categorized as secondary resource areas:

* Wood's Creek Park System
* Bike Path
* Glacial Potholes
* Active Farming
* Hydric Soils

Wood's Creek Park System

Characteristics:



Crystal Lake Park District

The Woods Creek area is the combination of several neighborhood parks. The park system starts along Huntley and Ackman Roads with Willows Edge Park, a 44 acre park with bike path, ponds and fishing. It moves to Sterling Meadows a 5 acre park with a basketball court, playground and bike path connection to Willows Edge. To the south is Woods Creek Park, at 40 acres it contains the Crystal Castle wooden playground, ball fields, bike path, wetland ponds for fishing and a multi-purpose building for activities. East of Golf Course road still south of Ackman Road is Fetzner Park. It is 22 acres with a playground, ball fields, basketball court and bike path. The bike path leads to the southeast through Winding Creek Park which is 9 acres.

Goal:

Maintaining this interconnected park system and protecting the amenities with each park is the main goal for this resource area.

Bike Path

Characteristics:



The City's bike paths are part of a regional system across Illinois. The main recreational trail that cuts through the City is the Prairie Trail owned and maintained by the McHenry County Conservation District (MCCD). The Prairie Trail is a 26 mile trail from the Village of Algonquin to the Wisconsin border and through the City. The City encourages bike planning within neighborhoods, across roadways and through coordination with other organizations. The City is in the process of adopting a Bicycle Facility Master Plan which identifies existing trails and establishes criteria and locations for new trails. There are several obstacles to overcome to ensure biking becomes more feasible.

Goal:

The main goal is to make biking a viable option for people to access recreation, shopping, transit options and schools.

Glacial Potholes

Characteristics:



The glacial potholes area is predominantly between Country Club Road and Doty Road at the far northern limits of the city. These potholes were formed by the receding glaciers as they moved across the landscape. The variety of natural features the glacial retreat created need to be preserved in their natural state. Development would typically require mass grading which would destroy the unique landscape. This is a significant area for wildlife in the undisturbed prairie along the creeks and in the woods.

Goal:

Long term preservation, protection and passive recreational use of this area is the main goal for this resource area.

Active Farming

Characteristics:



Diana Kenney, downtowncl.com

The state of Illinois is known for its corn and soybean production. The state has 76,000 active farms at 28 million acres. Annually they generate $9 Billion. McHenry County still retains large areas used for agricultural purposes. McHenry County has 1,035 farms at a total of 215,584 acres. This generates approximately $156,524,000 into the economy every year. It is important to understand the importance of farming for local access to fresh food and agri-tourism. Farming also helps to retain the rural character of the area. Within Crystal Lake, the northwest corner of our planning limits is primarily undeveloped and currently farmed. This area is also within the Crystal Lake Watershed. Future agricultural practices are encouraged to be organic farming.

Goal:

The retention of active farmland which utilizes the best management practices available is the main goal for this resource element.

Hydric Soils



Hydric soils are formed under conditions of saturation, flooding or ponding for long periods during the growing season. They develop anaerobic conditions which stops air from mixing well with the soil. The soil becomes saturated with water very near the surface and oxygen cannot effectively penetrate to the deeper soils layers. Plants with shallow roots like ferns or cattails and certain trees like cottonwoods and willows survive in hydric soils. Hydric soils are not suitable for construction. The main goal is to keep hydric soil areas from being developed.

Each one of the Secondary Resource Areas will be further explored within the Comprehensive Plan in accordance with the recommendations listed later within this plan.

Neighborhood and Site Strategies

Individual private and public property owners have the ability to contribute to the City's overall green infrastructure system. Neighborhood and site strategies can be implemented through City wide projects or the desire of an individual property owner. Neighborhood and Site Strategies are as follows:

* Bio-Swales
* Rain Gardens
* Native Plantings
* Green Roofs
* Porous Pavement
* Water Conservation

Bio-Swale



A bio-swale is a vegetated swale used as an alternative to storm sewers. The vegetation allows for the slower infiltration of the water while filtering out the contaminants. Bio-swales are typically located along roadways or parking lots where the first flush of stormwater would contain the most contaminants. New projects are encouraged to install the bio-swales adjacent to any new impervious surface area and adjacent to the roadway along their site frontage. Existing sites could remove impervious areas or install the bio-swales in open turf areas. Depressions in curbs would need to occur to allow the water to flow into the bio-swale rather than sheet flow into conventional storm sewer structures.



City of Burnsville, MN and Barr Engineering Co.

Rain Gardens

Rain gardens are similar to bio-swales as they utilize vegetation to infiltrate water on site. A rain garden is a smaller depressed area that allows rainwater runoff from impervious area such as a roof, driveway, turf lawns, etc. to infiltrate into the ground on site rather than be pumped away in the storm sewer system. Rain gardens are most likely found as retrofits on residential properties.

Native Plantings

Native plantings are not only beautiful but are also beneficial since they are adapted to the local climate and do not require fertilizers or extra watering to thrive. They also typically attract native birds and animals. Native plantings can be used in any residential area or in landscape areas around buildings or parking lots.



thewppc.org

Green Roof

Green roofs can be located on residential or commercial buildings. One of the more famous green roofs is located on City Hall in Chicago Illinois (pictured below). Green roofs absorb rainwater, reduce urban heat island effect and can provide habitat or food products. Green roofs are more practical on large commercial buildings.



Jake Kulju, ecolocalizer.com

Porous Pavement

Porous or permeable pavement can be found in sidewalks, driveways, multi-use paths and parking lots. The material can be asphalt, interlocking pavers or concrete. Grass, gravel and other unpaved surfaces are not permitted by Ordinance for driveways , roadways and parking areas. Standard paving allows contaminants to settle on the surface and then with the first rains wash into the storm sewers into rivers and creeks, polluting these bodies of water. Porous paving allows the rain water to infiltrate through the paving material back into the underground aquifers. The fine materials in the porous pavement helps trap some of the contaminants before they get into the water supply. Also since traditional storm sewers are not needed construction costs are cheaper. Porous materials can be used in residential and commercial applications.



www.perviouspavement.org



www.whypavegreen.org

Water Conservation

Water conservation can describe several methods that can be incorporated which save water. The best way to have clean water is to save what we have. The techniques mentioned above; rain gardens, porous pavement and bioswales allow water to be infiltrated back into the ground in locations close to where it was withdrawn rather than downstream in a river. Water conservation practices use alternative supplies of water for activities that do not require groundwater. One technique is rain barrels or water cisterns. These capture rain water, which can then be used for watering lawns or plants or washing cars. Another method is gray water reuse. Gray water is water after its first use such as a shower or washing your hands, which can be reused for toilet water or lawn irrigation. Clean drinking water supplies are being depleted; water conservation techniques are necessary to retain these supplies.



thewppc.org

Recommendations

Looking forward, there are opportunities to facilitate and expand the implementation of green infrastructure throughout Crystal Lake. Several recommendations follow.

* Add a green infrastructure or environmental element to the Comprehensive Plan providing an overarching goal for green infrastructure. The element shall identify and establish goals for each of the Highly Important and Secondary Resource Areas.
* Apply aggressive green infrastructure principles and standards, such as those identified in the Northwest Sub-Area and Crystal Lake watershed, throughout the city and its planning area.
* Encourage and require green infrastructure designs not just for new development but also for existing neighborhoods, redevelopment and retrofit projects, and for public infrastructure projects.
* Continue to evaluate zoning, subdivision, and landscaping codes to ensure that their provisions do not discourage or prevent green infrastructure designs.
* Incorporate requirements that ensure the long-term viability, functionality, and aesthetic standards of green infrastructure designs. For example, thorough provisions are needed for the maintenance, funding, and performance criteria for natural landscapes to ensure their health and prevent the spread of invasive weeds.
* Implement green infrastructure education programs and incentives for local residents, institutions, and businesses.

Maps

Illustrating green infrastructure through a series of maps shows the framework for the overall green infrastructure system. The maps in the Appendix illustrate each type of resource, for example there is a soils map and there is a separate wetland map. The Green Infrastructure maps illustrates the overall green infrastructure areas within and surrounding the city. The final map shows the Green Infrastructure System. The Green Infrastructure System is the combination of all the elements and providing new options for connections to create the overall system.

Summary

Crystal Lake's green infrastructure vision identifies a variety of green resource areas and provides logical links among these to establish a green infrastructure system. This system provides links for habitat, recreation and water quality. It also promotes the protection of natural and conservation areas, water resources and agricultural land. By having this plan in place, the City is better prepared to guide development to appropriate areas and incorporate conservation practices within developments.

Definitions

Anaerobic

Living in the absence of free air or oxygen. Referred to in this text to wet soils which do not allow for the mixture of air into the soil.

Bio-Swale

A swaled drainage course with gently sloped sides, filled with native vegetation and riprap designed to remove contaminants from stormwater runoff. The swale can meander or be straight but is designed to maximize the time water takes to infiltrate.

Ecosystem

A system formed by the interaction of a community of organisms and their environment.

Green Infrastructure

Green infrastructure can be used to identify a greener, more environmentally sustainable version of typical gray infrastructure, it can also be the identification, protection and interconnection of open space, including natural and human-altered landscapes. The U.S. Environmental Protection Agency identifies green infrastructure as techniques, such as green roofs, porous pavement, rain gardens and vegetated swales that use soils and vegetation to infiltrate, evapotranspire, and/or recycle stormwater runoff.

Hydric

Pertaining to a wet or moist environment. Referring to soils that contain or hold water for much of the growing season.

Infiltration

To infiltrate, to cause to pass in by filtering. In this respect it defines the path water takes as it get back into the ground.

Infrastructure

The fundamental facilities and systems serving a country, city or area; such as a roadway network.

Nature deficit disorder

This is a term coined by Richard Louv which refers to the trend that children are spending less time outdoors, resulting in a wide range of behavior problems. Although, this disorder is not recognized by any medical practitioners.

Rain Garden

A depressed area filled with native plants used to filter water runoff from impervious surfaces, typically driveways and roofs.

Watershed

A land area where the surface water runoff and underground water lead to a body of water. Crystal Lake is part of three watersheds, Crystal Lake Watershed, Fox River Watershed, Kishwaukee River Watershed.

Appendix

List of Maps

Map 1: Chicago Wilderness Green Infrastructure Vision, p. 4

Map 2: Detail of Chicago Wilderness Green Infrastructure Vision, p. 5

Map 3: CMAP Northern Illinois Regional Greenways and Trails Plan, p. 6

Map 4: Detail of CMAP Northern Illinois Regional Greenways and Trails Plan, p. 7

Map 5: McHenry County's Sensitive Aquifer Recharge Area, p. 10

Map A: Parks and Natural Areas, p.22

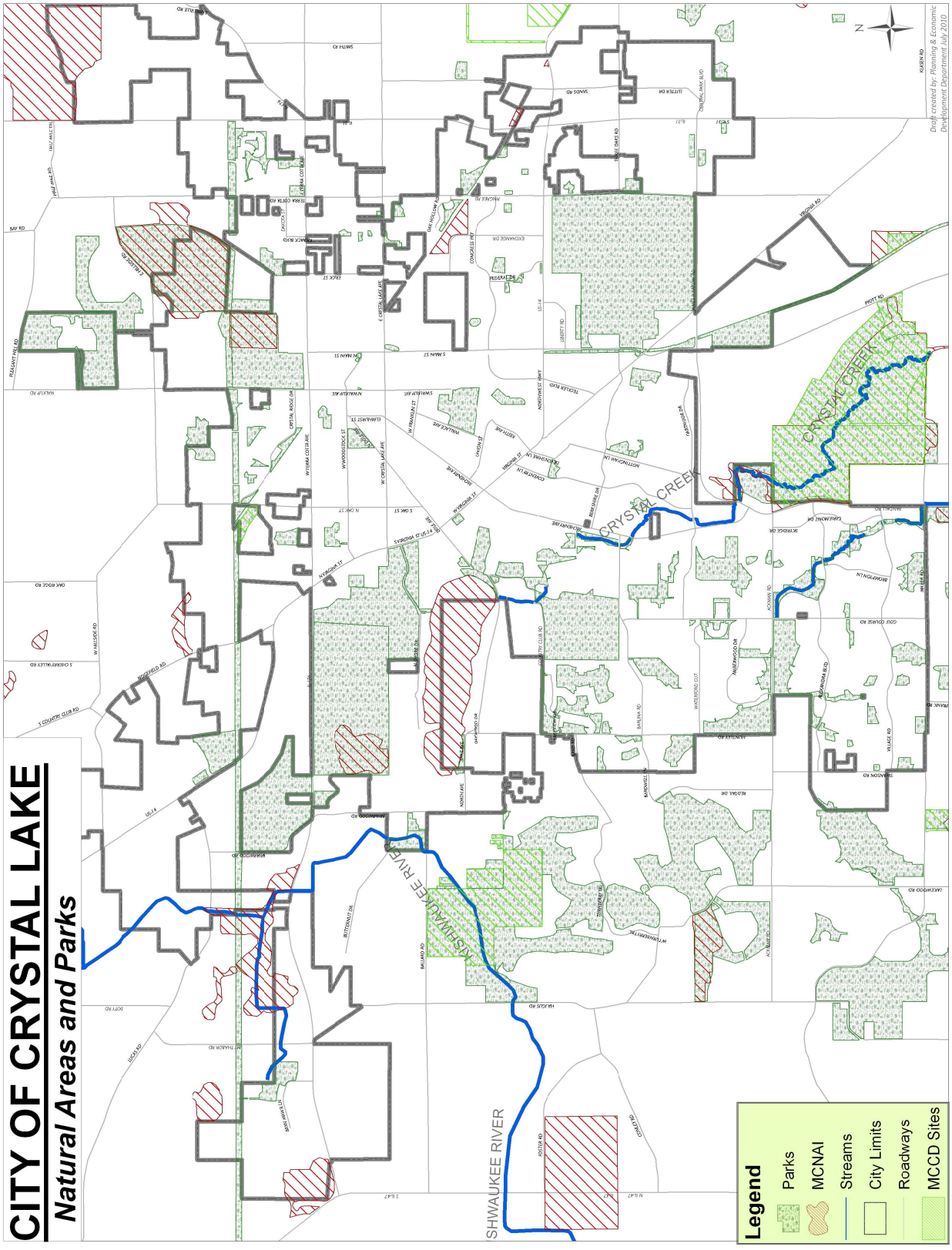
Map B: Water Bodies and Wetlands, p. 23

Map C: Oak Stands, p. 24

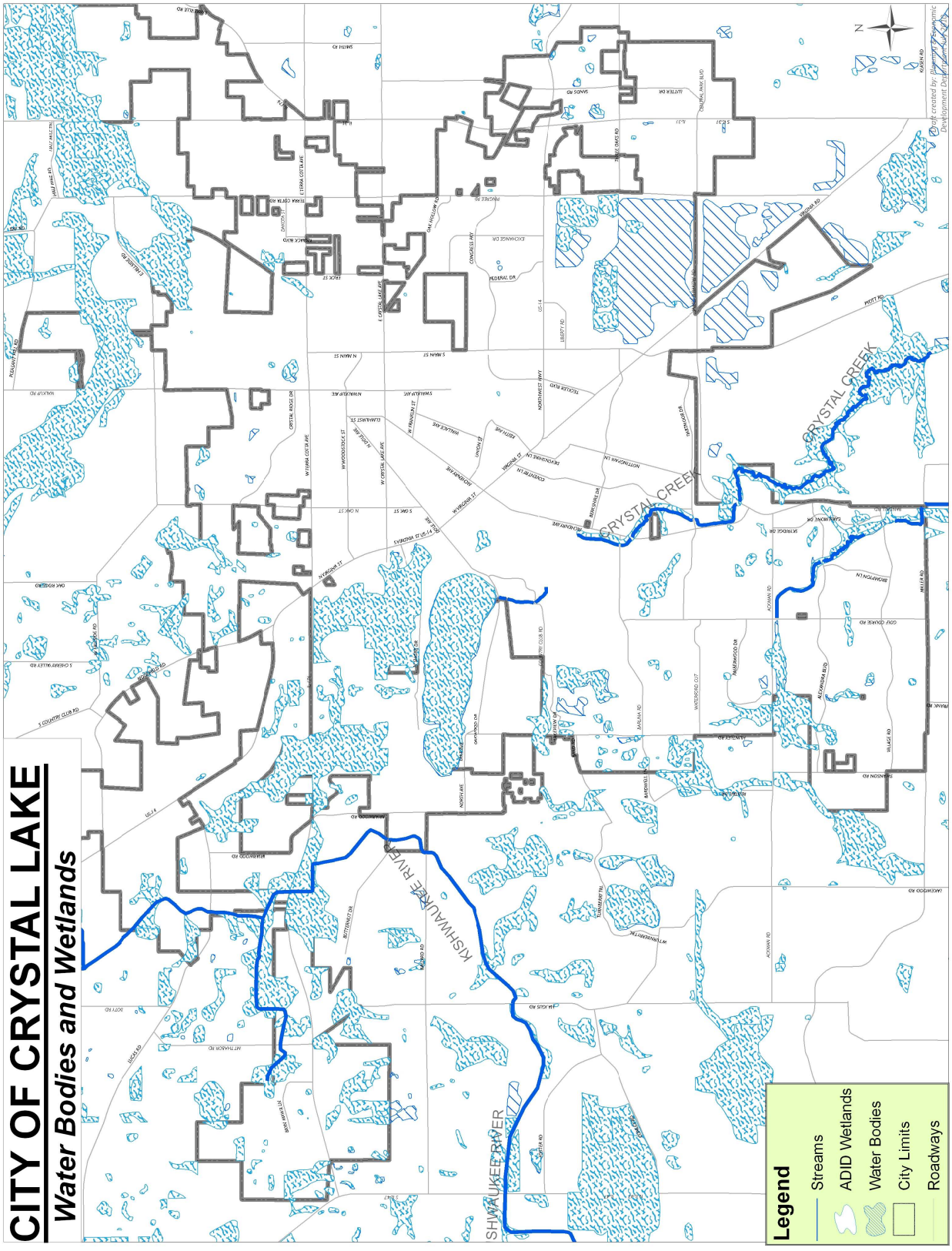
Map D: Hydric Soils, p. 25

Map E: Overall Green Infrastructure Vision, p. 26

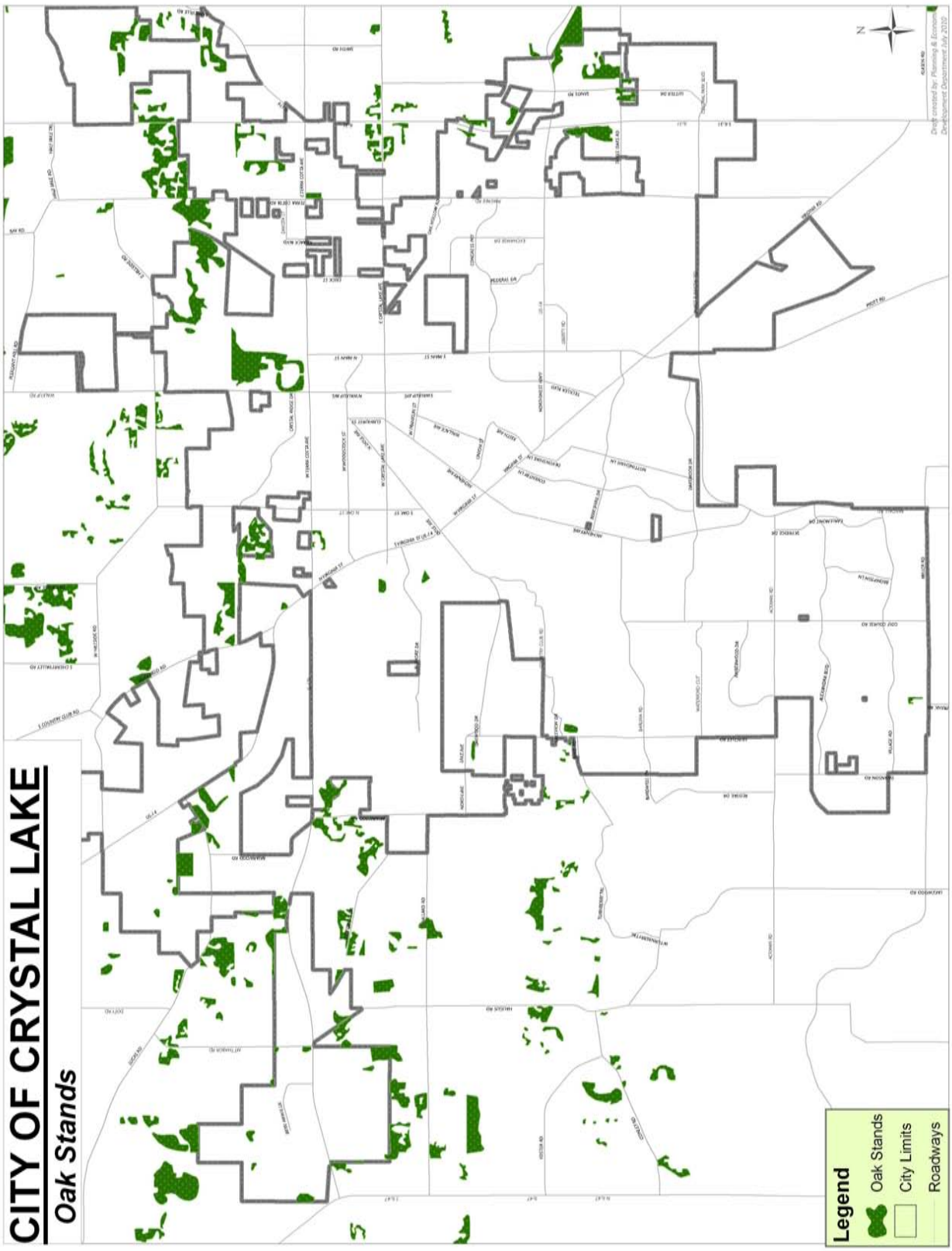
Map A


CITY OF CRYSTAL LAKE
Natural Areas and Parks
Draft created by Planning & Economic Development Department July 2010
CRYSTAL CREEK
CRYSTAL CREEK
SHWAUKEE RIVER
SHWAUKEE RIVER
Legend
Parks
MCNAI
Streams
City Limits
Roadways
MCCD Sites

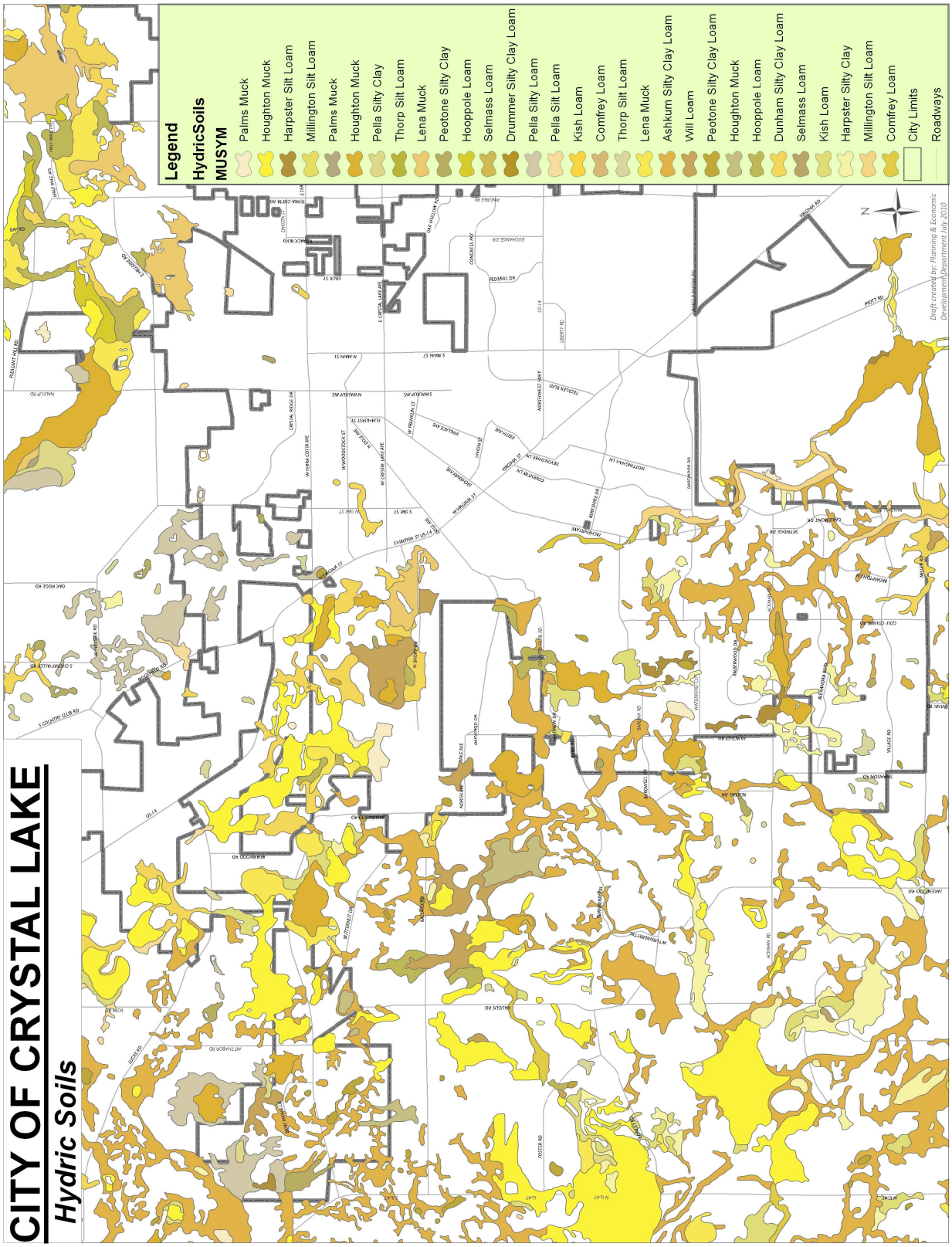
Map B


CITY OF CRYSTAL LAKE
Water Bodies and Wetlands
Legend
Streams
ADID Wetlands
Water Bodies
City Limits
Roadways
CRYSTAL CREEK
CRYSTAL CREEK
KISHWAUKEE RIVER
KISHWAUKEE RIVER
N

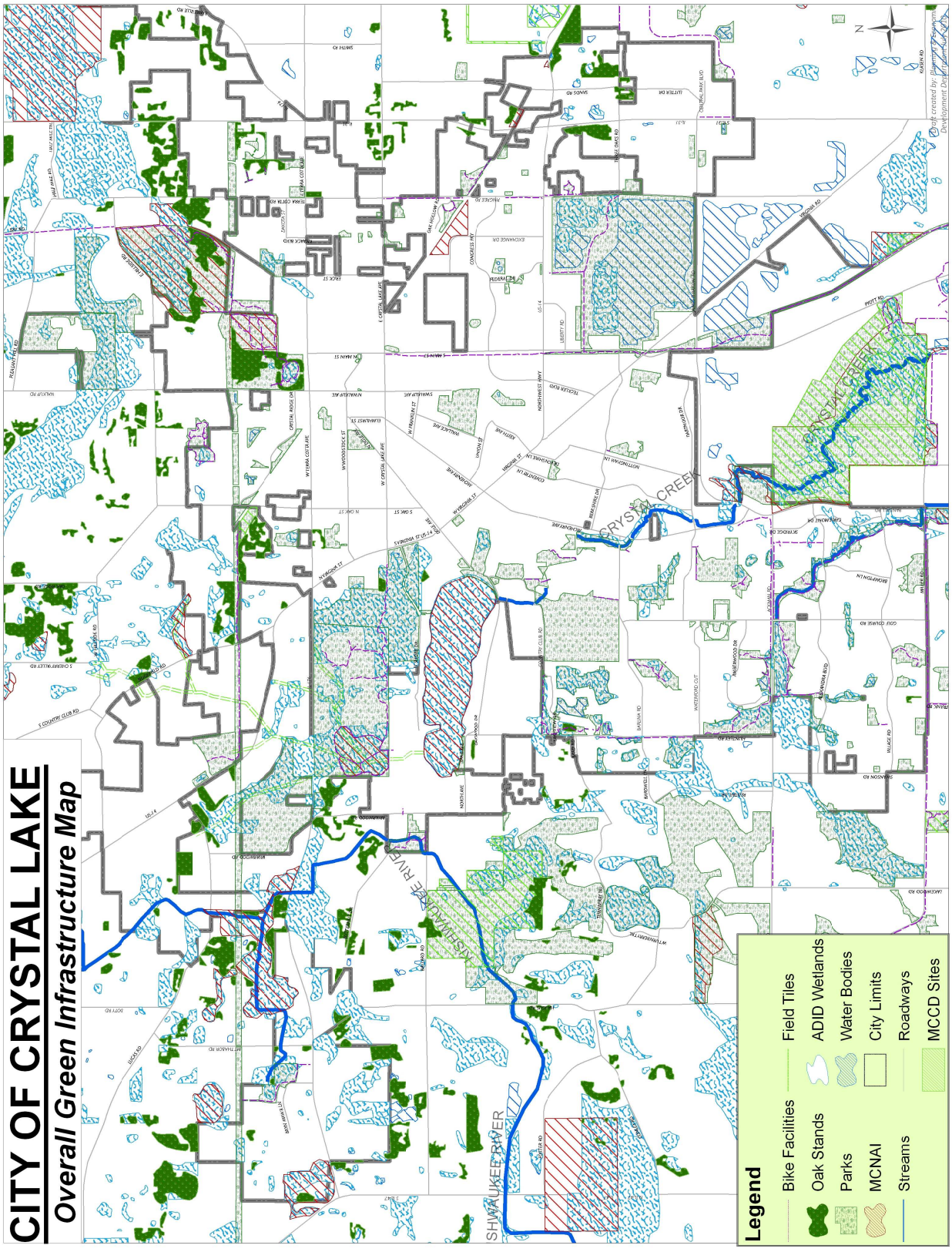
Map C


CITY OF CRYSTAL LAKE
Oak Stands
Legend
Oak Stands
City Limits
Roadways

Map D


CITY OF CRYSTAL LAKE
Hydric Soils
Legend
HydricSoils
MUSYM
Palms Muck
Houghton Muck
Harpster Silt Loam
Millington Silt Loam
Palms Muck
Houghton Muck
Pella Silty Clay
Thorp Silt Loam
Lena Muck
Peotone Silty Clay
Hooppole Loam
Selmass Loam
Drummer Silty Clay Loam
Pella Silty Loam
Pella Silt Loam
Kish Loam
Comfrey Loam
Thorp Silt Loam
Lena Muck
Ashkum Silty Clay Loam
Will Loam
Peotone Silty Clay Loam
Houghton Muck
Hooppole Loam
Dunham Silty Clay Loam
Selmass Loam
Kish Loam
Harpster Silty Clay
Millington Silt Loam
Comfrey Loam
City Limits
Roadways
N
Draft created by: Planning & Economic Development Department July 2010

Map E


CITY OF CRYSTAL LAKE
Overall Green Infrastructure Map
Legend
Bike Facilities
Oak Stands
Parks
MCNAI
Streams
Field Tiles
ADID Wetlands
Water Bodies
City Limits
Roadways
MCCD Sites
CRYSTAL CREEK
SHWAUKEE RIVER
N