

Green Cities

Description

The Green Cities Campaign of the Illinois Wildlife Action Plan (IWAP) advances habitat conservation and restoration in support of wildlife and plant species within the state's developed metropolitan areas. Metropolitan areas have higher levels of human population density with greater levels of structural development. These areas, however, still sustain significant wildlife and, as a result, having a Campaign dedicated to these areas is necessary to have a complete and effective statewide wildlife management strategy. As of 2014, urban areas in Illinois accounted for 7.4% of the total land area of the state (Figure 7). It is the goal of this campaign to look at the interaction of humans and natural resources to: provide recommendations to protect maintain and enhance resource function and species survival in urban areas; and address urban development patterns to help establish resilient and vibrant Green Cities in Illinois. This document is the collective result of input from multiple Illinois conservation partners (Appendix 3a and 3b).

Illinois' population is concentrated within a number of urban areas throughout Illinois. Urban areas were isolated first by using the US Census Bureau's Metropolitan Statistical Areas (MSA; <http://www.census.gov/population/metro/>) designation as primary basis for identification (Figure 8). A Metropolitan Statistical Area has an urban core with a population of 50,000 or more and it can contain multiple counties that either include the core area or are integrated socially and economically into the urban core. Population information for these metropolitan areas is found in Tables 7 - 10. For purposes of this campaign, eight Illinois Metropolitan/Urban Focus Areas have been identified: Rockford Metropolitan Area; Chicago Metropolitan Area; Quad Cities Metropolitan Area; Peoria Metropolitan Area; Bloomington & Champaign/Urbana Metropolitan Area; Springfield/Decatur Metropolitan Area; East St. Louis Metropolitan Area; and Carbondale/Marion Metropolitan Area (Figure 9). The whole of the Metropolitan Planning Area for the Quad Cities, Rockford, Peoria, and East St. Louis have also been included in the Focus areas shown. Please note that these defined areas do not contain the whole of Illinois' expanding communities and all recommendations in this section can be applied to other communities and cities throughout the State of Illinois. This

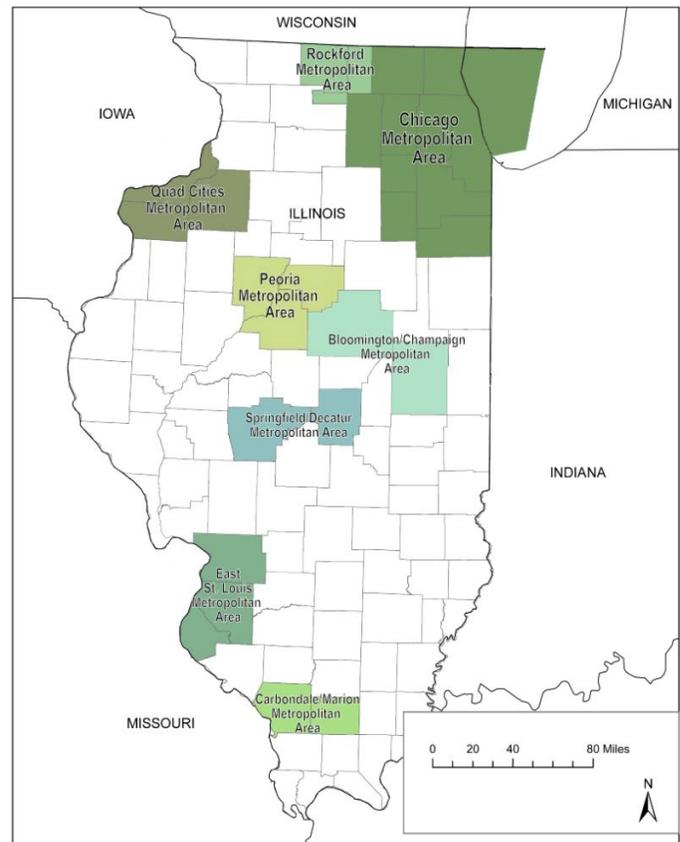


Figure 9. Metropolitan/urban focus areas - Green Cities Campaign.

campaign recommends focusing on the more densely populated urban¹ counties with these actions (<http://www.dnr.illinois.gov/conservation/IWAP/Pages/GreenCities.aspx>).

Why protect and enhance Metropolitan Area species and habitats in Illinois?

Cities and associated metropolitan areas are becoming increasingly important to global biodiversity conservation. Most cities were originally founded in places that are biodiverse and functionally valuable to society, such as in floodplains, along coasts, on islands, or near wetlands. Today, urbanization continues to expand into these valuable habitats and into the hinterland where society most often placed its biological reserves (McDonald et al. 2008). Species previously outside city limits may need to migrate through urban areas as they adjust to a changing climate (Hellmann et al. 2010).

In general, as the world urbanizes, we put pressure on species to make use of urban areas—to adapt and colonize. Some of Illinois’ metropolitan areas contain important populations of rare species (e.g., Blanding’s turtle and the prairie white-fringed orchid occur in the greater Chicago region), made more vulnerable to extirpation by their typically small population sizes and fragmented distribution patterns (McDonald 2013). Terrestrial natural areas in urban settings provide critical habitat for resident and migratory native species but tend to be small and isolated remnants of formerly widespread habitats that are progressively vulnerable to loss and degradation from a host of urban-centric stressors (Kowarik 2011; Cook et al. 2013). Often termed “green” or “natural infrastructure” by urban planners, the ecological functions of these natural areas and other undeveloped or formerly developed spaces provide crucial, but highly threatened, benefits to biodiversity and human communities of metropolitan regions (Goddard et al. 2011; Hostetler et al. 2011; Kattwinkel et al. 2011). Likewise, freshwater biodiversity is threatened by both water withdrawal for urban consumption (McDonald et al. 2011) and the addition of pollutants from urban stormwater, industrial, and residential sources (Alberti 2005; Blanco et al. 2011). These biodiversity impacts are all projected to accelerate as global urbanization trends continue to increase (McDonald 2013).

Twenty-six of the 32 Conservation Opportunity Areas (COAs) in Illinois are partially or totally located within the Metropolitan Statistical Areas of the Green Cities Campaign (Figure 10; Table 11). This means that the bulk of the State’s designated COAs are contained or intersect with existing urban and growth/projected growth areas. This is important for several reasons, as these COAs will come under continued threat due to development scenarios over the next several decades. But this also presents an opportunity to strengthen both the COAs and the Green Cities Campaign—these areas in and around the COA’s are where the people are, where the most “on the ground” conservation action is occurring, and where much of the private conservation funding is focused, particularly in northeastern Illinois. Because of the concentration of conservation professionals, concerned citizens and culture of working together to solve local problems, there exists the biggest potential and return on investment for collaboration, and partnerships to address the goals in both the Green Cities Campaign and the COAs.

Beyond benefits to wildlife, it has been repeatedly documented over the last decade that the integration of nature and wildlife habitat into, or back into, our cities and communities has multiple benefits to the social, economic and human health of the urban citizen. The introduction of increased natural resources into city neighborhoods through parks, urban tree canopy, stormwater best

¹ An **Urbanized Area** is a statistical geographic entity designated by the Census Bureau, consisting of a central core and adjacent densely settled territory that together contain at least 50,000 people, generally with an overall population density of at least 1,000 people per square mile (Table 6).

management practices, native plantings, stream buffering and linkages through trails have been shown to produce multiple benefits including; heat island reduction, flood reduction, increased groundwater recharge, and improvement in air and water quality. Along with wildlife benefits the “greening” of urban areas has also been shown to: improve community cohesion, aesthetics, and livability; reduce gray infrastructure costs, increase property values and enhance business districts; improve health and reduce noise pollution and crime; and increase access to and appreciation of nature.

The actions included within this campaign section are provided to help guide the next 10 years of implementation. While not an exhaustive list these actions have been identified to address the Green Cities Campaign. The campaign prioritizes the actions contained in this section as realistic, achievable and most needed within the next 10 years to best aid in meeting the overarching goals of all Campaigns of the Wildlife Action Plan:

1. Establish desired number and distribution of viable populations for each Species of Greatest Conservation Need (SGCN),
2. Manage habitats through promoting natural processes, desired structure, and disturbance regimes for the benefit of native species, and
3. Develop resiliency and connectedness into habitats so species can adjust to landscape and environmental changes.
4. Public will have an awareness, appreciation, and connection to SGCN and their habitats.

Goals

Illinois’ Metropolitan Areas support significant populations of SGCN (Appendix 6a and 6b), which include species identified by the Illinois Endangered Species Protection Board as Threatened or Endangered Species (Figure 12). These Illinois Metropolitan Areas also include a significant number of Illinois Nature Preserves and Illinois Natural Area Inventory sites (Figure 11; Table 12), fall within designated IWAP Conservation Opportunity Areas, and Important Bird Areas (Figure 12). The goals and actions identified within the Green Cities/Metropolitan Areas Campaign are critically important to supporting SGCN and the habitats upon which they depend. And collectively, these Metropolitan Areas provide valuable Statewide linkages for migratory species that are listed as SGCN.

Urban areas continue to expand, both in the Illinois and throughout the world. Cities contain a tremendous number of resources for species that can take advantage of them, and in some cases urban adapted populations exhibit higher survival rates and greater reproduction than their counterparts in more natural landscapes. As such, we should anticipate a wider range of species adapting to and making use of urban areas in the future. The trend towards increasing green space in cities will likely accelerate, providing additional habitat availability and complexity, and creating a wide range of niches for urban-adapted species.

Traditionally, cities have been viewed as biodiversity dead zones, regions hostile to wildlife where animal species might be managed, but never conserved. However, new urban conservation ethics are now emerging, in part due to the rapidly urbanizing nature of the planet, and in part because formerly rare species such as the Butler’s Gartersnake and Black-crowned Night-heron (once common, now rare) have been found in metropolitan areas. ‘Reconciliation ecology’, sometimes called ‘win-win’ ecology, is the branch of conservation biology devoted to conserving species diversity in the heart of human-created ecosystems. Concepts from landscape ecology, animal behavior, conservation genetics and other fields can be applied to allow for healthy populations of wildlife in cities. These

efforts can increase the connection of urban residents to nature and improve ecological literacy, and also help minimize conflict between humans and animals in urban spaces.

The Green Cities Campaign seeks to elevate the importance of Illinois metropolitan areas for their significant habitats and species diversity, address the need to protect, enhance and expand significant habitat for species in metropolitan areas, and replace former or existing land use policies and development patterns with a new paradigm that values wildlife and the habitats upon which they are dependent.

The Green Cities Campaign Goals:

1. Protect, manage, and restore lands and waters of importance to SGCN.
2. Utilize elements of good preserve design to identify and preserve land that builds and connects large and small blocks of habitat.
3. Integrate wildlife and habitat conservation needs into local and regional planning,
4. Increase the ecosystem services² in Illinois urban areas through functioning and resilient natural habitats, connections and corridors, and site-scale practices.
5. Develop citizen awareness of natural resource and wildlife value to promote understanding and support for wildlife conservation.

Status as of 2015

The Green Cities Campaign is not associated to a specific habitat or community type but metropolitan SGCN have benefitted from actions occurring regionally and state-wide in the last ten years. Listed below is a non-comprehensive sample of State and regional actions, policies, and accomplishments reflecting advances for Illinois IWAP since 2005 that have enhanced the State of Illinois and metropolitan areas ability to maintain and protect SGCN and their associated natural habitats.

Region-wide Status

ADDRESSING URBAN CONSERVATION ACTIONS

- **Ecological Places in Cities (EPIC) 2014** - Numerous Illinois agencies, NGOs, educational institutions and conservation organizations are participating in the EPIC Network Steering Committee for Urban Watershed Management. EPIC is a joint focus of the two of the US Fish and Wildlife Landscape Conservation Cooperatives: the Eastern Tallgrass Prairie & Big Rivers Landscape Conservation Cooperative (EPTBR LCC) and the Upper Midwest Great Lakes Landscape Conservation Cooperative (UMGL LCC). EPIC's draft mission is: *Provide people living in cities with resources to harmonize people, wildlife, natural and working landscapes and to cultivate the love of life and living systems.* <http://www.tallgrassprairiecc.org/what-we-do/>

Statewide Status

1. ADDRESSING HABITAT ASSESSMENT/ENHANCEMENT ACTIONS

A number of resource agencies in Metropolitan areas have been managing habitats to enhance resource value for SGCN. The following provide valuable update information on the effectiveness of management activities.

² **Ecosystem services** are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth.

- **Illinois Natural Areas Inventory Update (INAI) – completed, assessment in progress**
The INAI is a record of high quality forests, prairies, wetlands, and other significant natural features first conducted in the mid-1970s for the Illinois Department of Natural Resources (IDNR). It was a three-year project conducted by the University of Illinois that identified 1,089 sites as natural areas. These 1,089 sites covered 25,723 acres, which represents only 0.07% of all the land area of Illinois. While the list of INAI sites has been maintained by IDNR since the first inventory was conducted 30 years ago, many changes have occurred. Some INAI sites have been degraded and others added.
- **The Illinois Sustainable Natural Areas Vision (SNAV)** is the corollary to the Illinois Natural Areas Plan written in 1980 following the completion of the first INAI. The SNAV update's primary goal is to set forth a workable, implementable framework for creating a sustainable connected system of natural areas. http://www.inhs.illinois.edu/files/9513/3907/5663/SNAV_Final.pdf

2. ADDRESSING IMPACTS OF DEVELOPMENT TO WATER

The following studies, strategies, and updates provide guidelines for comprehensive practices to address stormwater and flooding issues including site-based green infrastructure practices and Best Management Practices to achieve infiltration and water quality benefits, directly benefitting urban streams species.

- **The Illinois Nutrient Loss Reduction Strategy (2015)** guides state efforts to improve water quality at home and downstream by reducing nitrogen and phosphorus levels in our lakes, streams, and rivers. The strategy lays out a comprehensive suite of best management practices for reducing nutrient loads from wastewater treatment plants and urban and agricultural runoff. <http://www.epa.illinois.gov/topics/water-quality/watershed-management/excess-nutrients/nutrient-loss-reduction-strategy/index>
- **Urban Flooding Awareness Act Study** - The IDNR prepared the report completed June 2015 in collaboration with other state agencies, at the direction of the Illinois General Assembly to detail the extent, cost, prevalence, and policies related to urban flooding in Illinois and to identify resources and technology that may lead to mitigation of the impacts of urban flooding. http://www.dnr.illinois.gov/WaterResources/Documents/Final_UFAA_Report.pdf
- **Illinois Urban Manual Update 2014** - updated by the Illinois Association of Soil and Water Districts in collaboration with IEPA. It contains criteria for planning, Best Management Practices (BMP) selection, practice standards, construction and materials specifications and evaluation methods. <http://www.aiswcd.org/illinois-urban-manual/>
- **Illinois Environmental Protection Agency Green infrastructure Plan and Illinois Department of Natural Resource Addendum (2010)** - Illinois EPA assessed and evaluated methods for site-scale green infrastructure to help manage stormwater in Illinois. The plan identifies effective best management practices, site-scale green infrastructure standards and institutional and policy frameworks. Department of Natural Resource's Addendum adds large-scale green infrastructure planning elements. <http://www.epa.illinois.gov/topics/water-quality/surface-water/green-infrastructure/index>

3. ADDRESSING NATURAL RESOURCE VALUE OUTREACH

- **OAKtober!** October was designated as a statewide Oak Awareness Month in Illinois in June 2015. The oak ecosystem supports many SGCN in Illinois. Outreach during the month of October calls for individual, organization, community, park district, forest preserve, and public or private landowner or manager to be involved and play an important role in celebrating oaks and oak ecosystems across Illinois throughout the month of October.

4. ADDRESSING RECREATIONAL ACCESS FOR WILDLIFE RELATED ACTIVITIES

The Department of Natural Resources instituted the **Illinois Recreational Access Program (IRAP)**, to increase public access and participation in outdoor activities and enhance public connection to wildlife. The IDNR works with private landowners who open their land for fishing, hunting and nature viewing experiences to the public.

- **Illinois Recreational Access Program (IRAP)**, established in 2011, received its second USDA VPA-HIP grant in 2014 and another on August 17, 2015 to lease private land and make it available for public access for specific outdoor activities. Focus areas for leases are northern Illinois in the counties surrounding Cook County and southern Illinois. Metropolitan areas will receive a higher lease rate. IRAP is also working diligently on invasive species removal on leased acres and will be pursuing establishment a mentor database to assist new and inexperienced hunters. For every leased dollar spent, 3 more dollars are spent on habitat management practices. <http://www.dnr.illinois.gov/conservation/IRAP/Pages/default.aspx>

Metropolitan/Urban Area Status (within specific Urban Focus Areas)

1. NATURAL RESOURCE PLANNING & ASSESSMENT

A. Chicago/Northeastern Illinois Metropolitan Area:

- **The Ramsar Convention designated The Chiwaukee Prairie Illinois Beach Lake Plain as a Wetland of International Importance in September 2015.** The 3,914 acres lake plain includes 15 miles of Lake Michigan coastline straddling the Wisconsin and Illinois borders. Partners in preserving and managing the site include: Illinois and Wisconsin DNR, UW-Parkside, the villages of Pleasant Prairie and Winthrop Harbor, Zion and Waukegan Park Districts, and the Lake County Forest Preserve District. The Lake Plain provides critical stopover habitat for over 310 migratory bird species, and supports six globally rare community types and two federally protected wetland species - the threatened and rare eastern prairie fringed orchid (*Platanthera leucophaea*) and the habitat for the federally endangered piping plover (*Charadrius melodus*). <http://www Ramsar.org/wetland/united-states-of-america>
- **GO TO 2040 Plan, Chicago Metropolitan Agency for Planning (CMAP) – 2008.** Funded by a Federal HUD Sustainable Communities grant, CMAP completed a three-year intensive community public engagement process that called for investment in existing communities and emphasizes development that is more compact and “livable.” CMAP recommended making significant, criteria-based investments in parks and open space including adding an additional 150,000 of preserved open space and providing functional connections using the green infrastructure network as a design concept. <http://www.cmap.illinois.gov/about/2040/supporting-materials/process-archive/regional-vision>. CMAP is currently working on the plan update and has developed numerous sustainable development resources in addition to this plan. <http://www.cmap.illinois.gov/about/updates/policy>
- **The Chicago Wilderness Green infrastructure Vision (GIV), 2012.** First regionally assembled GIS-based natural resource map and plan for the Chicago Metro area. Resource mapping is extended beyond Illinois state borders to include CW region’s portions of Indiana and Wisconsin, in recognition of watershed boundaries and linkage impacts. Links to the full GIS data download and The Field Museum interactive mapper are available at: <http://www.chicagowilderness.org/?page=publicationsnew>

- **Quantifying resource benefits: Chicago Metropolitan Agency for Planning Ecosystem Valuation – 2015.** The Conservation Fund, CMAP, and Chicago Wilderness conducted an ecosystem service valuation of the GIV landscapes in CMAP’s seven county region. The project quantified the ecosystem and economic benefits of the region’s green infrastructure. Some of the measured ecosystem services provided by green infrastructure, using the GIV, included flood reduction, air and water pollutant removal, biodiversity, and carbon sequestration, and capture the monetized value of those ecosystem functions to communities. <https://datahub.cmap.illinois.gov/dataset/green-infrastructure-vision-2-3-ecosystem-valuation>
- **The Chicago Regional Trees Initiative, The Morton Arboretum** - was established in 2013 by Chicago region partners working together to develop and implement a strategy that builds a healthier and more diverse urban forest by 2040. A coalition of agency, industry, and community representatives are working together to expand the understanding of the value of the region's trees and to make meaningful tree and forest improvements in the region. This information will be transferrable to other urban areas. <http://www.mortonarb.org/science-conservation/chicago-region-trees-initiative>
- **Oak Ecosystem Recovery** – Chicago Wilderness, in collaboration with The Morton Arboretum and Lake County Forest Preserves, has developed and is implementing a regional work plan for the Chicago Wilderness Oak Ecosystems Focus Area. Mapping of remnant oak woodlands and savannas for Northeast Illinois was completed in 2015 as a first step in the process, with the following short-term actions for the near future: expand mapping of remnant oak ecosystems to the rest of the Chicago Wilderness Region of Southeast Wisconsin, Northwest Indiana, and Southwest Michigan; establishment of priority areas; compilation of baseline data; assessment of research gaps; selection of relevant metrics; prioritization of land management needs; identification of key partners and audiences and incorporation of climate considerations. Five-year goals, including health status, trends, and tracking, are being developed. <http://www.chicagowilderness.org/?page=OakEcosystemsFocus>
- **Bird monitoring as a resource for habitat restoration and management decisions** – the Bird Conservation Network, in collaboration with Chicago Region Forest Preserve Districts, Park Districts and other major public and private landowners, implemented a comprehensive and robust regional bird monitoring program (The BCN Survey) beginning in 1999. The Survey has amassed a large volume of breeding bird data, collected by volunteer bird monitors of the Region. A key goal of this analysis is to learn the regional population trends of the Region’s breeding bird species to improve land management practices, educate the public, monitor species of concern, etc. An updated statistical analysis of the ongoing program results is conducted every 2 to 3 years. <http://www.bcnbirds.org/trends13/index.html>

B. Rockford Metropolitan area:

- **Winnebago & Boone Counties Greenway Map and Plan** - 2006, updated 2014. Adopted into the Winnebago County 2030 Comprehensive Land Use Map. County conservation partners worked with Winnebago County GIS (WinGIS) to assemble the natural resource layers of Winnebago and Boone Counties to create a greenways map. The core concept of the plan is green infrastructure connections that will create a

corridor of open space for public enjoyment as well as a place for plant habitation and movement of animals. <http://ims.wingis.org/Greenways/>

- **Winnebago Natural Resource Inventory (NRI)** map developed by Winnebago County Planning Department with input from multiple resource agencies to accompany the 2030 Comprehensive Land Use Map. <http://ims.wingis.org/OtherResources.aspx>
- **Rock River National Water Trail** was designated in 2010 by the National Park Service with the assistance of local area citizens. Through public and private partnerships, the *Rock River Trail Initiative* develops, maintains, and promotes the Rock River Water Trail to provide enhanced recreational opportunities for all to enjoy. <http://rockrivertrail.com/>

C. East St. Louis Metropolitan Area

- **A Roadmap for Green infrastructure 2013** - lead by The Heartlands Conservancy and involving agencies, businesses, corporations, municipalities and conservation stakeholders in cooperative planning for a vision of a regionally connected green infrastructure system for a more resilient region. The Heartlands Conservancy has this resource, and other resources available on their site. http://issuu.com/heartlandsconservancy/docs/13-12-green_infrastructure_roadmap
- **OneSTL** - funded by HUD Sustainable Communities Regional Planning Grant, this plan was developed through a collaborative process led by the East-West Gateway Council of Governments. It provides a regional framework for sustainable development that citizens, non-profit organizations, businesses, and local governments can use to make better use of resources and better meet the aspirations and needs of residents, and toolkits for getting there. <http://www.onestl.org/>

D. Quad Cities Metropolitan Area

- **Upper Mississippi Conservation Opportunity Area Plan (2012)** – gathered cooperative, collective input from a wide spectrum of local conservation partners to develop a plan for this COA. <http://prairierivers.org/wp-content/uploads/2013/01/UMR-COA-Master-Plan-Version-3.pdf>

E. Springfield/Decatur Metropolitan Area

- **Lake Springfield Watershed-based Plan and BMP Implementation (2014)** - A half million dollar project underway to put together one of the most comprehensive watershed plans in Illinois. The project will implement best management practices (BMP) in the Lake Springfield watershed to reduce nonpoint source pollution, soil erosion, and nutrient and sediment loadings in order to improve water quality in Lake Springfield and its watershed. Major funding came from IEPA through a 319 grant. A 170,000-acre watershed, Lake Springfield is a major drinking water source for many communities in Sangamon County.

2. HUMAN AND WILDLIFE INTERACTIONS

- **The gray wolf, American black bear and mountain lion (cougar) came under the protection of the Illinois Wildlife Code on Jan. 1, 2015.** IDNR was given the authority to manage these species for the protection of both wildlife and public safety.

Historically present in Illinois, this bill was prompted by increasing sightings and incidents in the state.

- **Large Carnivore Workshop, 2014**, Chicago Wilderness Alliance, IDNR and USFWS convened a large carnivores workshop as a first step in developing a coordinated, regional strategy to living with these species.
- **The Urban Wildlife Institute**, based at Lincoln Park Zoo, studies the interaction between urban development and the natural ecosystem to develop scientific standards for minimizing conflict between these overlapping areas. Landscape ecology, population biology, epidemiology, endocrinology, veterinary medicine and other core disciplines contribute to an increased understanding of ecosystem health in an urban setting. <http://www.lpzoo.org/conservation-science/science-centers/urban-wildlife-institute>

3. CLIMATE ADAPTATION

- **Chicago Wilderness Climate Action Plan for Nature** - the region's first analysis of how to navigate the complexities of nature conservation in a world with a changing climate. http://www.chicagowilderness.org/resource/resmgr/Publications/CW_CAPN_Action_Strategies.pdf
- **Climate Change Update to Chicago Wilderness Biodiversity Recovery Plan** – Analysis of how climate change impacts critical biodiversity in the Chicago region, providing initial strategies for adapting to changing climate. Information are both studies above available at: <http://climate.chicagowilderness.org/index.php?title=Introduction#Box1>
- **Chicago Climate Action Plan** - 2008. City of Chicago in conjunction with The Field Museum and other area resource experts and local stakeholders identified climate considerations and goals for the Chicago to the Year 2050. <http://www.chicagoclimateaction.org/>

Stresses and Threats to Wildlife and Habitat

Illinois' large population of 12.8 million is identified in the 2010 U.S. Census figures as being 88% "urban." And though figures and definitions of urban areas can vary, the primary message is that most of Illinois' population, as it is across the nation, is economically linked to central urbanizing communities for work and goods and services. As noted above, many of these metropolitan areas were originally targeted for settlement based on their abundant resources. The impact of development in these metropolitan areas has included loss, degradation, and/or fragmentation of wildlife habitat and has degraded the ecosystem services provided by our lands and waters. Despite these impacts, Illinois metropolitan areas support a disproportionately large number of SGCN in protected and unprotected habitats that materially add to the quality of life of those who live in metropolitan Areas.

With close to 7000 units of local government, more than any other state in the nation, Illinois jurisdictional landscape is often noted for its fragmentation. This can be particularly apparent in land use planning, with development decisions made at the smallest local scale. Where other areas of the country can collaborate under a regional authority, allowing for comprehensive planning on scales such as watersheds, Illinois jurisdictions operate within their own boundaries, making cross-jurisdictional planning difficult or non-existent. Decades of fractured development have led to degraded water quality and polluted urban streams, flooding and stormwater issues, and loss of

valuable habitat. Targeted actions will require collaboration between area conservation stakeholders to address the stressors and begin to change the standard development climate. Steps include the need to organize as a conservation community, inventory and set conservation goals, and begin to educate and assist jurisdictions in charge of development.

Both urban development and agricultural practices put further stresses on Illinois' wildlife and plants through increased loss of habitat, nutrient loads, pesticides and erosion. Approximately 27 million acres or 75 percent of Illinois' total land area is under agriculture, with approximately 89 percent of Illinois agricultural land suitable for growing commodity crops (http://www.nass.usda.gov/Statistics_by_State/Illinois/Publications/Farmfacts/farmfact.pdf).

Removal of fencerow habitat and increased drainage of farmed wetlands continues to add to the loss of remnant habitat for many SGCN species (Figure 13). The monoculture in so much of our landscape has made remnant habitat protection in urban areas even more critical to Illinois SGCN.

In recent years, Illinois' population movement and development have primarily occurred in suburban areas on the fringes of larger metropolitan areas. Though the pace of sprawl development has slowed, this urban fringe pattern continues, increasing the amount of developed land and degrading and fragmenting already limited wildlife habitat. Lack of integration of natural resource function in development patterns continues to exacerbate flooding, water quality impairments, exposure to invasive species, and heat and atmospheric pollutants. Illinois metropolitan areas are also hubs for transportation of goods and products resulting in increased vulnerability to foreign invasive pests, pathogens and species. There is a critical need to improve urban planning efforts to include open space and wildlife needs into metropolitan areas but there are numerous obstacles and threats that need to be addressed.

See other Campaigns for additional stressors identification for specific habitats and issues.

Habitat Stresses:

Extent (amount of habitat)

- Loss of species habitat due to competing human demands on land use.

Fragmentation

- Fragmentation of habitats from roads and development that degrade land and water resources, inhibit species movement, and increase edge effect impacts on SGCN.
- Loss of historic canopy cover and important urban migratory stopover habitat.

Disturbance/Hydrology

- Alteration of surface and groundwater hydrology adversely affecting water and groundwater hydrology, water quality, water temperatures, and water quantity.
- Stress on critical water and groundwater-dependent habitats and associated species through increasing competition on water resources.

Invasive/Exotic species

- Urban ports of transportation and goods that facilitate introduction of foreign invasive pests, pathogens and species increasing vulnerability of SGCN.
- Rapid spread of invasive species through maintenance and landscape practices

Pollutants – Sediment/Nutrients

- Increase in heavy rainfall events with increases in stormwater volume, velocity and sedimentation.
- Nutrient, pharmaceutical and other pollution from wastewater and other point source discharges, affecting stream and wetland SGCN.

Composition-structure

- Loss of tree species of high resource value for SGCN, such as Oaks
- Lack of financial resources to protect, manage and restore high quality resource habitats.

Community Stresses:

Predators

- Increase in urban adapted meso-predators adding to vulnerability of SGCN to predation.

Parasites and Disease

- Spread of emerald ash borer and other disease.

Population Stresses:

Recruitment

- Poor regeneration rates of existing high habitat-value woodlands and forests.

Direct Anthropogenic Stresses:

Killing

- Declines in insects and pollinators due to loss of native plant and tree species, insecticide use, and urban monoculture landscape practices.

Disturbance, Structures-Infrastructure

- Lack of urban tree canopy diversity and tree canopy loss due to poor selection and planting practices.
- Lack of effective urban deer management programs to counter effects of deer browse and overpopulation.
- Increasing conflict between humans and wildlife species. (e.g. deer collisions, coyote, other meso-predator conflicts).

Structures – Infrastructure

- Loss of aquatic species habitat and spawning connectivity from dams, culverts and channelized streams.

Climate Change

- Climate change that is expected to compound and exacerbate existing stressors.

Other

- Diminished recreational access resulting in a public not connected to the natural world.
- Lack of public understanding of the value of nature and necessity of functioning natural systems for wildlife and human health and well-being.
- Lack of municipal strategic plans that include and prioritize wildlife and habitat protection - failure to recognize natural resource value and function.

- A fragmented, competitive, and disparate development atmosphere that discourages regional or watershed-wide planning implementation.

Focal Species and Associated Actions

Focal species are a set of species selected for each campaign to represent the larger suite of SGCN addressed by the campaigns. They will be the primary focus of monitoring efforts to determine the success of campaign actions. Focal species were selected to represent specific habitat dependence or a species guild that has important conservation value, and are likely to show measurable change in response to campaign actions taken in the timeframe of this plan. Focal species were also selected because populations are currently being monitored in some way or could reasonably be monitored effectively and efficiently. The IWAP recognizes that there are limitations to accomplishing the recommended conservation and monitoring activities outlined in the Campaigns imposed by the availability of funding and existing staffing levels.

Multiple conservation partners participated in Metro or statewide urban focus groups develop the focal species and priority habitat sections (Appendix 3). Partners in developing the Green Cities Focal Species have selected the following species as representative species to monitor the effectiveness of conservation actions for the associated habitats.

STATE-WIDE - FOCAL SPECIES FOR ALL URBAN AREAS:

As noted previously in this Campaign, metropolitan areas in Illinois are playing an increasingly important role for Illinois SGCN species, and the following three focal species have been identified for metropolitan Areas on a statewide basis.

1. Urban migratory stopover habitat - Focal species: Neotropical Migrants

Urban areas in Illinois provide valuable stopover habitat for migrating birds (Table 13). Many bird species that breed in the boreal forest and winter in the neotropics rely on habitats in Illinois to replenish fat reserves. In many areas of the state, agricultural and commercial development has left little in the way of wooded habitat that migrants can use. Urban areas represent a wooded canopy and understory in which many birds stop while migrating. Several Important Bird Areas (Figure 12) as designated by the National Audubon Society are stopover habitats within cities (Busey Wood, Urbana; Chicago lakefront parks; Ewing Park, Bloomington, etc.). Large patches of natural habitat are the best resources for these migrants, but any patch of greenspace has value from city and county parks to corporate campuses, cemeteries and schoolyards, to trees along residential streets.

Actions:

- Research urban area's value for migrating birds.
- Expand large scale monitoring of urban/suburban area neotropical migrant bird populations in Illinois metro areas (e.g. Bird Conservation Network; <http://www.bcnbirds.org/trends13/index.html>)
- Urban and suburban habitats can be improved to make cities friendlier to migrating birds. As an example, the city of Chicago has an agreement with the US government to conserve birds, especially migrants, within the city (<http://www.fws.gov/migratorybirds/partnerships/urbantreaty/urbantreaty.html>). It focuses on improving habitats for birds and reducing the hazards birds face from human

infrastructure (e.g. windows strikes on buildings and communication towers (www.bcnbirds.org)).

- Prompt planting of specific tree species. Not all trees and shrubs in urban areas are of equal value to migrating birds. Research suggests that hardwoods such as oak and hickory support greater insect biomass and are preferred by migrating birds, while fast growing trees such as ash and elm hold less value for birds.
- Encourage pet owners to keep their cats indoors.
- Plant native trees and shrubs. Local bird clubs have on-line documents that provide suggestions for improving urban and suburban habitats, including planting lists (http://www.bcnbirds.org/greenpapers_files/GPflyway.html).

2. Pollinators – Focal Species: Monarch Butterfly

Native pollinators (particularly bees and butterflies) are critical to the maintenance of biodiversity, and unique opportunities for their conservation exist in metropolitan areas. Pollination of flowering plants provides food for both humans and wildlife, including species of greatest conservation need. Pollinators are also an important food source for migrating birds, which are also a conservation target in metropolitan areas. Because of the key roles pollinators play and the emerging threats they face, many pollinators are themselves now a priority for conservation. For example, once-common species such as the Rusty-patched Bumblebee (*Bombus affinis*) and Monarch Butterfly (*Danaus plexippus*) are currently found in metropolitan areas of Illinois, but they are experiencing precipitous population declines across their range and have been considered for listing under the federal Endangered Species Protection Act. Widespread pollinator decline has been recognized at the highest levels of government, with a Presidential Memorandum on Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators issued in 2014. Native insect pollinators rely on the presence of high quality plant habitat that contains appropriate nesting sites, host plants, and a diverse array of native wildflowers for nectaring (Murray et al. 2009; Tonietto 2015, USDA). Opportunities to increasingly support the conservation of native pollinators in metropolitan areas are directly linked to providing diverse native plant communities. As such, efforts should focus on: 1) managing natural areas for native plant diversity; 2) restoring degraded habitat to support native plant and pollinator diversity; and 3) enhancing landscaping around homes, businesses, and along roads to incorporate native plants (Scheper et al. 2013, Tonietto, 2015).

Conservation of bees and other important insects requires habitat that includes adequate food and nesting areas. Most bees and other insects do not generally fly long distances. For this reason, many small plots across a large area may be more desirable than one native prairie park several acres in size surrounded by miles of lawn and non-native landscape. Such small plantings in a home flower bed or near a public building or commercial property can provide large amounts of pollen and other resources. Many bees are dependent upon pollen from only a few plants to meet the nutritional requirements of their larvae. Further, the availability of floral resources throughout the year requires plantings that incorporate species with varied bloom times. For these reasons, diverse plantings of native species in metropolitan areas would be an important means of supporting diverse communities of native bees and other insects (Table 14).

Actions:

- Conserve existing pollinator habitat areas.
- Restore/create habitat areas for pollinators in urban landscapes – incorporate plant species with varied bloom times.

- Use integrated pest management to reduce pesticide exposure.
- Survey and inventory pollinator taxa in urban areas.
- Include pollinator data in state Natural Heritage databases and NatureServe.
- Development of S-ranks and G-ranks for pollinator species.
- Work with partners to develop and implement community outreach programs.
- Address roadside/right-of-way mowing practices and habitat establishment for pollinator corridor opportunities.
- Coordinate with US Fish and Wildlife and the Eastern Tallgrass and Big Rivers Landscape Conservation Cooperative on the regional Monarch and pollinator initiative.

3. SGCN that thrive in urban areas - Focal species: Common Nighthawk

Urban environments support a unique assemblage of species, some of which are Species of Greatest Conservation Need. These species include Common Nighthawk, Peregrine Falcon, Black-crowned Night-Heron, and Chimney Swift. While each species has unique requirements, one species whose population has been declining at an alarming rate is Common Nighthawk. Nighthawks are an aerial insectivore that specializes on larger insects such as moths. The decline in habitats that support insects (i.e., pollinators) may be a contributing reason for the rapid decline of this species. While the species continues to breed in native sand prairies, the bulk of its population in Illinois resides in towns, in which they nest on rooftops. While nesting on rooftops eliminates the threat from many terrestrial nest predators, changes in the materials used on roofs (nighthawks prefer gravel roofs) may be limiting nesting habitat. Nighthawks are also vulnerable to being hit by cars as they forage over roads or roost on roadways at night (State of the Birds Report, 2014). Common Nighthawk breeding distribution is highly concentrated around major cities in the eastern U.S. Threats include reduction in mosquitoes and other aerial insects due to pesticides, and habitat loss including grasslands, open woods and flat gravel rooftops in urban/suburban areas.

Actions:

- Research/Investigate other conservation methods. Some success has been reported by creating nesting habitat by placing gravel pads in the corners of rubberized roofs and by burning and clearing patches of forest to create open nesting sites.
- Restore habitats (e.g. landscape with native plants) that support insect populations in urban areas; robust insect populations would likely benefit nighthawks.
- Reduce pesticide application (e.g. area-wide mosquito spraying) to help promote a robust insect community, and benefit Nighthawks.

Focus Areas and Associated Actions

At the time of this update in October 2015, two Metropolitan Areas, Rockford and Chicago, have completed a process to identify Priority Habitats and Focal Species for their area and are included in this section. It is recommended that other Metropolitan/Urban Focus Areas also undertake identification of priority habitats and focal species for inclusion in the Green Cities Campaign.

ROCKFORD METROPOLITAN FOCUS AREA - Priority Habitats and Focal Species

Rockford Metropolitan Area: Boone, Winnebago, and Ogle Counties.

Rockford Metropolitan Area lies at the boundary of three Natural Divisions of Illinois, the Northeastern Morainal, the Rock River Hill Country and the Grand Prairie. It includes three designated Conservation Opportunity Areas (COA): Sugar-Pecatonica Rivers, the Coon Creek/Kishwaukee River, and the Rock River. The Rockford Metropolitan Area is extremely rich in natural habitat, Species of Greatest Conservation Need, and water resources. It is the confluence of four major river systems in northern Illinois and includes several important coolwater streams. The four rivers, which form the framework for the natural resource plans for the area, are the Sugar, Pecatonica, Kishwaukee (North, South and Main Branches) and Rock. The Sugar and Kishwaukee rivers are biologically significant streams; highly valued for their natural and recreational resources and hold rich fish and mussel populations. The four rivers have very different hydrology and geomorphology, and as such each have different goals, focus species and actions.

The Rockford Metropolitan Agency for Planning (RMAP) has produced the Boone and Winnebago Greenways Plan, and a Sustainable Development Plan for Boone and Winnebago counties and RMAP has recently expanded its planning area to include the City of Byron in Ogle County. Decades of efforts to acquire land for parks, forest preserves and conservation areas in the region have resulted in the preservation of thousands of acres of land along the four rivers for public recreation and wildlife. The Rockford and Belvidere Park Districts own several parks along the Rock and Kishwaukee rivers, including important habitat for wildlife. The Forest Preserves of Winnebago County, Byron Forest Preserve District, Natural Land Institute, IDNR and the Boone County Conservation District own thousands of acres of important wildlife habitat in the region.

Groundwater is the sole source of drinking water for the region, and provides significant base flow to the rivers, creeks and wetlands of this area. The Illinois Groundwater Protection Act recognized the unique geomorphology of this region and identified this specific area as an objective of its initial focus with IEPA establishing the Northern Regional Groundwater Protection and Planning Committee in the late 1980's. This committee is involved in regional planning efforts in Winnebago, Boone and McHenry counties to protect groundwater and provide expertise to local officials.

Priority Habitats and Focal species for Rockford Metropolitan area

1. STREAMS AND RIVERS - FOUR RIVERS AND RIPARIAN AREAS

Riparian habitat in the Rockford metro area is abundant, with four major rivers flowing through the area. The habitat value of these streams—both in terms of water quality and hydrologic character—varies widely, though. The best habitat occurs within the Kishwaukee River and Sugar River drainages, which harbor a number of species of greatest conservation concern. One such species, the Black Sandshell mussel, was once widespread in these counties and likely occurred in all but the smallest streams; today, it is restricted to the relatively clean waters of the Kishwaukee River. Pollution represents the greatest threat to

this species, particularly nutrient pollution from agricultural runoff. The Rock River is a major corridor for migratory waterfowl and Neotropical birds, while the east-west flowing Pecatonica and Kishwaukee Rivers provide vital stopover habitat for migrating birds. The extensive forests and wetlands in the Pecatonica River valley have been recognized by the U.S. Fish and Wildlife Service, The Nature Conservancy and the IDNR as important habitat for migratory birds. For all river corridors it is important to address and monitor point (e.g. wastewater treatment discharge) and non-point (e.g. road run-off) pollution.

Over all Focal Species for all Four River Watersheds: River otter and bald eagles. Once extirpated from the region, river otters were reintroduced to the area, and now healthy populations are found in all four-river systems. A single Bald Eagle nest along the Pecatonica River expanded to breeding pairs on every one of the four rivers in the region. Bald Eagles are now a common sight flying along the Rock River in downtown Rockford, Rockton, Belvidere and Byron. Additional focus species are listed below for each of the four rivers.

Kishwaukee River Watershed

The Kishwaukee River is a high-quality, groundwater-fed glacial outwash river, with portions classified by the Illinois Department of Natural Resources as class A. The North and South branches of the river converge in Winnebago County at Blackhawk Springs Forest Preserve. It has been a priority of open space agencies in the Rockford metro area to protect lands along the Kishwaukee River to preserve habitat communities, protect water quality, and limit run-off. Immediate threats to the entire watershed come from development due to access from I-39, the Chicago-Rockford Airport, the Winnebago County Landfill and economic growth potential of Rockford and Belvidere. The entire Kishwaukee River watershed offers a diverse range of habitats from floodplain forest, upland forests, sedge meadows, oxbows, and many prairie communities. There are large sections along the Kishwaukee River with steep slopes and a few cliff communities. Unique upland forests and exposed rock outcroppings provide a diverse range of plant and bird species. The river itself holds a diverse mix of mussels and fish.

Focal species: Black Sandshell Mussel. Actions would also benefit Osprey, Black-billed Cuckoo, Red-Shouldered Hawk, Cerulean Warbler, Smallmouth Bass, Cope's Grey Tree Frog, River Otter, and Blanding's Turtle.

Actions:

- Accelerate land preservation and active management.
- Establish buffer areas.
- Install erosion and run-off controls.
- Use prescribed fire.
- Control invasive species.
- Protect groundwater to assure continued stream baseflows.
- Reduce nutrients and pollution from wastewater plants (ammonia, sediment, other) for pollution sensitive mussels and fish.
- Monitor water quality, species richness, and population numbers.

Pecatonica/Sugar Rivers Watersheds

The Pecatonica River is a tributary of the Rock River. The Sugar River is a tributary of the Pecatonica River. The Pecatonica River is a low gradient, meandering, deep muddy river while the Sugar River is clean, shallow, swift and sandy. Both rivers have many oxbows and floodplain wetlands associated with them. Extensive floodplain forest is found within this

watershed. Many of the wetlands that once occurred here have been drained for farming through ditches and tiling. Invasive species, such as Reed Canary grass, are a major problem in the floodplain wetlands.

Focal species: Pileated Woodpeckers. Actions will also benefit: Sandhill Cranes, Black-crowned Night-Herons, River Otters, Blue-spotted Salamanders, Fragile Papershell Mussel, and Pistol Grip Mussels, American Bittern and Blanding's Turtle.

Actions:

- Protect additional land to create large blocks of forest habitat.
- Fill drainage ditches and break drain tile to rebuild wetlands where feasible.
- Provide large buffer areas to filter water to enhance water quality.

Rock River Watershed

The Rock River, extending from the Rockton Dam to the Oregon Dam, has sculpted the lands lining its banks into a variety of important habitats, ranging from sandbar islands and shallow, rocky riffles to flood plain forests and scenic, forested limestone bluffs. It harbors many species of fish, and many more species of birds, both nesting and migratory. This stretch of the Rock encounters urban, rural, and natural areas. Industrial, and municipal discharges, agricultural runoff, highways, railways, and the Rockford Airport all can impact water quality of the river. The series of dams on the Rock River are known to isolate fish and prevent them from reaching important spawning areas. The recently designated *Rock River National Water Trail* is an opportunity under which to coordinate actions (<http://rockrivertrail.com/>).

Focal species: Walleye, a fish native to the upper Rock River and stocked in the river in the past, is a highly sought-after sport fish by anglers. It plays a key role as a predator and also as a nutritious prey species for Bald Eagles and Ospreys. Walleye are also a host for the Fatmucket, a mussel known to be an important food source for River Otters.

Actions:

- Coordinate transportation project planning along the Rock River corridor - especially Illinois Route 2.
- Limit erosion and runoff from agricultural and urban areas.
- Adopt special regulations on walleye fishing (i.e. lowering the bag limit, adding a slot limit, special seasonal regulation of night fishing at dams).
- Remove or modify barriers to fish migration.
Identify and prioritize valuable habitats and lands.
Install wetland restoration projects, particularly in conjunction with the Rock River corridor.

Cool Water Streams

Kinnikinnick, Beaver, Coon, Raccoon, Mosquito, Piscasaw, and Kilbuck creeks are tributaries to the four rivers, and provide high quality habitat for many species of wildlife in greatest need of conservation, including healthy populations of mussels and cool-water species like Mottled Sculpin, *Cottus bairdii*. Mottled Sculpin are found in tributaries of the Kishwaukee and Rock River. Historically, there were Mottled Sculpin in Kinnikinnick Creek and Raccoon Creek. Stream modifications have altered groundwater inputs and the natural hydrology of the streams. Barriers to fish movement include low-head dams and culverts with elevation drops. Bottom substrates and benthic invertebrates are susceptible to smothering from

sedimentation. Drainage activities and removal of native riparian vegetation buffers accelerate erosion and overland transport of sediments into streams.

Focal species: Mottled Sculpin

Actions needed to protect the natural hydrology, and water quality of the coolwater streams in the region include:

- Complete an inventory of streams in region to document existing populations of Mottled Sculpin and other cool-water fish species.
- Monitor groundwater supplies and characterization (e.g., temperature and salt pollution from septic systems and road run-off), and monitor groundwater extractions.
Promote recharging of regional aquifers by allowing more precipitation into the ground.
- Encourage use of native vegetation that helps draw water into the soil.
- Remove or modify barriers to fish migration.

2. OAK WOODLANDS

Oak Savanna

Oak savannas are some of the most important communities in the region. Many savanna areas were cleared for agriculture and developed for towns and villages while remaining savannas quickly turned into dense forests after wildfires were stopped. Some efforts have been made to restore savannas where remnants exist and to recreate savannas from bare ground by planting trees and native prairie species together (e.g. at the Nygren Wetlands complex). Many urban parks retain savanna-like tree structure, but lack the native understory and ground layer species. Limiting factors that land managers face are controlling the deer and rodent populations, very slow growth of oak trees, and the continuous battle with exotic and invasive species.

Focal species: Red-headed Woodpecker. Actions for this species will also benefit Brown Creeper.

Actions:

- Control invasive species.
- Increase fire frequency.
- Create savanna areas as buffer zones between prairies and woodlands.
- Promote oak regeneration.
- Acquire and build large continuous tracts of land.

Oak-Hickory Woodland

Oak-Hickory forests were once common in the Rockford metro area, but have been reduced to scattered remnants due to clearing, and residential development. The few remnants that remain are small, disconnected and degraded by past grazing, lack of fire and invasive species like bush honeysuckle and multi-flora rose. Regeneration of oaks and hickories is low to non-existent, and remnant woodlands are slowly being taken over by sugar maple, black cherry and other shade-tolerant species. A large number of neotropical migratory birds are dependent upon healthy oak-hickory forests for breeding.

Focal Species: Ovenbird. Expansion and regeneration of oak-hickory woodlands will also benefit Wood Thrush and Broad-winged Hawk.

Actions:

- Inventory oak-hickory woodlands in the Rockford metro area and evaluate their health.
- Develop management tools to regenerate oaks and hickories.
- Remove invasive trees and brush, and restore understory species.
- Connect and expand blocks of upland oak-hickory forests where possible to increase habitat for neotropical migratory birds.

3. GRASSLANDS

Upland grasslands once dominated the landscape in the Rockford Metro area. Very few remnants exist to this day and almost all native grasslands are re-created. Challenges with re-creating grasslands and managing them are the continued threat from invasive and exotic species, lack of diversity, and performing routine management activities. One of the biggest limiting factors on the recovery of some to these species is fragmentation. Management and protection of these species require setting aside large tracts of land, having good travel corridors, management that promotes plant diversity, invasive species control, and implementing a regular fire regime.

Focal species: Dicksissel. Actions will also benefit Bobolinks, Henslow's Sparrows, Green Snakes, Badgers, Franklin's Ground Squirrels, and Monarch Butterflies.

Actions:

- Protect and acquire more land that can be restored to grasslands.
- Increase diversity of grassland plant species.
- Maintain habitat long term by improving burn regiment and invasive control.

CHICAGO METROPOLITAN FOCUS AREA - Priority Habitats and Focal Species

Chicago Metropolitan Area:

McHenry, Lake, DeKalb, Kane, Cook, DuPage, Will, Grundy and Kankakee Counties.

The Chicago Metropolitan Area lies with two defined natural divisions: The Northeastern Morainal Natural and Grand Prairie Division. The Northeastern Morainal Natural Division, covering much of DuPage, Kane, Lake, McHenry, and Will counties, contains a landscape of the most recently glaciated portion of Illinois. Four distinct Sections within in the Division are recognized due to variations in topography, soil, glacial activity, flora and fauna. Drainage is poorly developed in some areas, thus abundant marshes, natural lakes, and bogs are distinctive features. Other areas have well-drained glacial outwash soils with seeps, fens, and springs. This area holds the unique Chicago lake plain and ancient beach ridge, bluff and panne communities, along with most of Illinois' glacial lakes and a significant number of the State's remaining wetlands and savannas. Higher gradient streams flow over gravel, cobble, and bedrock, providing good substrate for habitat and more stable stream bed characteristics compared to than many older' regions of Illinois with loess-dominated soils. Stable, rocky substrate, combined with significant ground water flow in some areas provides unique coolwater conditions for excellent gamefish populations and diverse non-game communities.

On the outer ring of the Chicago Metropolitan area are Kankakee, Grundy, Kendall and DeKalb Counties that lie primarily within the Grand Prairie Natural Division. The Grand Prairie Natural Division of central and east-central Illinois is a vast plain formerly occupied primarily by tallgrass prairie, now converted extensively to agriculture. Natural drainage of the fertile soils was poor, resulting in many marshes and potholes. This area includes Kankakee Sands, Pembroke Savannas, Kankakee River and Momence Wetlands Areas with opportunities for habitat restoration of black oak sand savanna, sand prairie and sand flatwoods communities, and in-stream restoration. The Midewin, DesPlaines, Goose Prairie Macrosite lies within this natural division, where restoration and management of tallgrass prairie vegetation are on-going.

The Chicago Metropolitan Area hosts the greatest biodiversity in Illinois with diverse wetlands, prairie, forest, savanna, lakes, and streams. Like most areas of the State, natural land cover has been extensively altered and expansion of development continues to be a major threat. Along with the largest human population, the Chicago Metropolitan Area also has the most extensive acreage of protected natural areas, managed by seven Forest Preserve and Conservation Districts, the USDA Forest Service, IDNR, and numerous other conservation partners.

1. GRASSLANDS - FOCAL SPECIES – BOBOLINK

Grassland birds have declined precipitously in abundance as their preferred habitats in Illinois have been converted to row crops and, in urban areas, additional residential and commercial development. During the 25-year period ending in 1984, grassland birds in Illinois declined by as much as 75-95% and their numbers continue to decline. Grassland birds are “area sensitive” and are attracted to larger blocks of grasslands. Additionally, larger grasslands provide more secure nesting habitat with lower rates of nest predation. The Chicago metropolitan area remains an important stronghold for grassland birds, primarily because large grasslands have been protected and restored by natural resource agencies. Research and monitoring of these grasslands has documented that the abundance of grassland bird species has remained stable or increased. Restoration efforts that target the bobolink will also benefit Henslow’s Sparrow, Eastern Meadowlark, Smooth Green Snake and a host of other grassland species. The Bird Conservation Network has an extensive system for monitoring grasslands so that the baseline abundance of grassland birds and their population trends over time (<http://www.bcnbirds.org/trends13/index.html>) has been established for many locations. Some notable grasslands in the Chicago metro area include Orland and Bartel Grasslands, Glacial Park, Goose Lake Prairie, Springbrook Prairie, Nelson Lake Marsh, Midewin National Tallgrass Prairie and Rollins Savanna. Grassland birds face significant threats related to development, the lack of fire and resultant brush invasion, and invasive species. See Herkert et al. (1993) for a review of habitat management guidelines for grassland birds.

Actions:

- Protect large parcels of non-linear grasslands.
- Identify areas on urbanizing edge where large grassland tracts can be established.
- Remove woody incursions such as tree lines, mow brush, and mow herbaceous weeds.
- Restore hydrology.
- Establish a fire regime.

2. OAK WOODLANDS

Oaks and oak dominated ecosystems provide myriad benefits within the Midwest region, including food and habitat for wildlife species, ecosystem functions such as carbon storage and water regulation, and natural beauty for the enjoyment of the people who inhabit them (Dwyer et al. 1992). Oaks are foundational species in forested ecosystems across the temperate zone, creating ecosystem structure and supporting an array of plant and animal life (McShea and Healy 2002, Rodewald and Abrams 2002, Spetich, 2004). Oaks provide the structure that shapes Chicago's savanna, woodland and forest habitats, and promote high biodiversity in part because they foster heterogeneous landscapes. The oak ecosystems of the Midwest region are generally classified into four categories based on canopy density and composition and structure of associated plant communities: Forests – 60-100% cover, Woodlands – 25-60% cover, Savanna – 10-25% cover, and Open savanna/barrens – >0-25%. Many of the oak species that were abundant in the Midwest region are adapted to live in fire-dominated ecosystems. The historical landscape's frequent fires therefore favored open oak barrens, savannas and woodlands. White, bur, red, and black oak were most common, but varied in abundance across the region with fire frequency and edaphic factors.

Many species identified as Species of Greatest Conservation Need in the Illinois Wildlife Action Plan are associated with high quality, open oak ecosystems including: Red-headed Woodpeckers, Black-billed Cuckoos, Northern Flickers, Wood Frogs, and Blue-spotted Salamanders. In addition, many other wildlife species utilize the energy rich acorns produced by oaks as well as the nuts of the hickories, walnuts, and hazelnuts that are associated with these ecosystems. These nut crops are a major food source for a wide variety of birds, mammals, and insects and are a key component of food webs in the region. Finally, oaks are a very important source of shelter for wildlife species in the form of cavities in large, old trees, standing dead trees, and downed woody debris. Many species rely on these cavities for burrows or nesting locations.

Mesic Oak woodlands – Focal Species - Blue spotted Salamander

In the Chicago metro area, the more mesic oak woodlands are restricted to moist soils arrayed along the eastern shores (or fire shadows) of the Des Plaines, Du Page, Chicago, and Fox Rivers.

Actions:

- Restore and maintain vernal pool systems.
- Remove invasive species.
- Restore hydrology.
- Implement actions to encourage oak regeneration.
- Assemble large 1000 acre woodlands/forested complexes.
- Link protected oak complexes to existing urban oak canopies.
- Educate the public on the value of oak woodlands.

Dry/Mesic Oak woodlands – Focal Species - Red-headed Woodpecker

The dry-mesic woodlands exist throughout the Chicago metro area, are associated with rolling topography characteristic of the Northeastern Morainal Division, and occur on drier soils formed from glacial till.

Actions:

- Remove invasive species.

- Restore hydrology.
- Implement prescribed burning.
- Adopt management practices that encourage oak regeneration, while maintaining existing large blocks of mature woodlands.
- Assemble large forested complexes - 1000 acre woodlands;
- Reduce edge effects.
- Link protected oak complexes to existing urban oak canopies.
- Adopt management practices that benefit oak ecosystem dependent bird species.

3. WETLANDS

Sulloway and Hubbell (1994) provide a good overview of the extent and distribution of different types of wetlands in Illinois. Many of those wetlands occur along rivers and lakes that later became developed as urban areas. Emergent wetlands that support diverse and abundant populations of wetlands birds occur in northeastern Illinois (Sulloway and Hubbell 1994). Northeast Illinois once supported large numbers of freshwater wetlands. Despite the efforts to drain or fill these wetlands, a large number of wetlands still survive in the region and support the largest populations of Yellow-headed Blackbirds, Sandhill Cranes, Black Terns, and Virginia Rails in the state. A study of 12 wetland bird species from 196 wetlands in the region during the period 1980-2005 showed that 10 species declined in abundance while only 2 species increased in abundance (Ward et al. 2010). The study further demonstrated that the value of wetlands to wetland birds was compromised by development within 2 km of the wetland basin.

Freshwater marshes – Focal species – Yellow-headed Blackbird

The preferred nesting habitat of the Yellow-headed Blackbird, and many other wetland bird species, consists of an interspersed of emergent vegetation and open water known as a “hemi-marsh”. While many wetlands have been protected by natural resource agencies, the hydrological regimes necessary to establish “hemi-marshes” are frequently compromised by land use decisions on adjacent properties that preclude natural fluctuations in water levels. With altered hydrological regimes, hemi-marshes typically become either monocultures of emergent vegetation or open ponds; both of which support fewer wetlands birds.

Actions:

- Manage the hydrological regime in wetland basins with water control structures that are manipulated to aid in establishing hemi-marsh conditions by drawing down water levels to reestablish wetland vegetation or by increasing water levels to prevent solid stands of emergent vegetation from becoming established.
- Establish a collaborative approach by natural resource agencies to manage for hemi-marsh wetlands on a regional basis to provide habitat for a number of wetland bird species that have declined in abundance over the last 25+ years.
- Use existing wetland basin models to prioritize acquisition and restoration of wetland basins and sites with hydric soils in the Chicago Wilderness area during the implementation period. Utilize the two Chicago Wilderness wetland basin models, one for wetland birds and one for amphibians and reptiles, which rank the value of several parameters (wetland size, distance to nearest wetland, adjacent land uses).

Fen wetlands - Focal Species - Baltimore Checkerspot (*Euphydryus phaeton*).

Fen wetlands are the rarest wetland communities in Illinois and nearly all occur in the Northeast Morainal Natural Division of Northeastern Illinois. Fen wetlands are represented by six community types that include calcareous floating mat, calcareous seep, forested fen, graminoid fen, low shrub fen, and tall shrub fen. Collectively, fen communities identified on the Illinois Natural Areas Inventory are represented by only 353 acres at 44 different locations (Byers 2000). Many, but not all of these fen wetlands occur with the Lake-McHenry Wetland COA. Most fen wetlands are associated with sand and gravel lenses laid down by torrential melt during the retreat of the Wisconsin glacialiation. Rainfall percolates through these glacial deposits, becomes laden with calcium and other minerals, and surfaces in groundwater discharge zones. The groundwater discharge zones provide habitat for unique plant and animal communities.

Fen wetlands are extremely sensitive to alterations in groundwater quality and groundwater flow rates and are, consequently, sensitive to land use changes that occur in and well beyond the actual groundwater discharge zones. Land use changes that affect infiltration rates in groundwater recharge zones (conversion from pasture or agriculture to more intensive land uses) or groundwater quality (high chloride levels associated with roadways) can also degrade fen wetlands.

Actions:

- Implement management that includes controlled burning (2- to 3-year rotations) and efforts to remove invasive woody and herbaceous species.
- Identify and protect groundwater recharge zones, using tools such as designation of a Class III groundwater zone for dedicated Illinois Nature Preserves in which fen wetlands are located.
- Address and monitor salt contamination of source groundwater for fens, especially from water softeners on septic systems.
- Restore hydrology by removing woody invasive species and implementing steps (installing check dams to rehydrate the peat, and removing drain tiles) that restore hydrological function.
- Reintroduce extirpated insect species³. Establish protocols for identifying suitable host populations and developing captive rearing strategies that can lead to reintroductions.

4. STREAMS

Urban streams - Focal Species – Iowa Darter (*Etheostoma exile*)

Iowa Darter prefers clear water with vegetation in lakes or streams of moderate to slow current, which would include portions of the Fox River and Des Plaines Rivers and numerous tributaries of these rivers. Aquatic vegetation can grow in a variety of stream habitats, in both slow and fast currents. Iowa Darter lives along the bottom, hidden among the

³ The Baltimore Checkerspot is known from 15 locations in northeastern Illinois (Cook, Kane, DuPage, Will, Lake, and McHenry Counties) and is actively monitored by the Illinois Butterfly Monitoring Network. It occurs in close association with the larval host turtlehead (*Chelone glabra*) in the northern part of the state. Implementation of management activities, and protection of the groundwater resource will maintain populations of the Baltimore Checkerspot. In some instances, reintroduction of the Baltimore Checkerspot to restored habitat is appropriate.

vegetation, foraging on small aquatic invertebrates. They spawn over fibrous root mats, but will settle for filamentous algae or other vegetation at times. They are not particularly good swimmers, so strong currents run the risk of displacing them if there is no cover for them to find shelter from extreme flows. Reducing the flashiness of streams will prevent the scouring of streambeds and also benefit Iowa Darters along with a host of other species.

Actions:

- Improve water quality and clarity by reducing the amount of pollutants and particulates that enter the stream. Clearer and cleaner water will facilitate growth of native aquatic vegetation.
- Use native riparian vegetation buffers help prevent erosion and overland transport of sediments into streams.
- Enhance the effectiveness and capacity of wastewater treatment facilities (e.g., reduced phosphorus loads).
- Protect and buffer headwater wetlands and wetlands adjacent to streams to filter water before it enters the mainstream channel, these areas may provide additional habitat for Iowa darters.
- Increase stream habitat heterogeneity by creating meanders and leaving woody debris, natural stones, etc. in the stream channel to facilitate the formation of pools, riffles, side channels, backwaters, etc. The resulting variety of depths, current velocities, and bottom substrate types will provide the basis for habitat heterogeneity.
- Decrease flashiness of streams by allowing more rainwater to enter the ground (e.g., permeable pavement, plantings of native trees, shrubs, grasses, etc.).
- Install non-point source infiltration practices to mitigate discharge from wastewater treatment facilities after extreme storm events to reduce or eliminate the occurrences of Combined Sewer Overflows.
- Create natural floodplains adjacent to streams.

Coolwater Streams - Focal Species - Mottled Sculpin (*Cottus bairdii*)

Coolwater streams in northern Illinois are typically of small to medium size. Primary source of water is groundwater, which helps explain the colder temperatures. In some instances coolwater streams start from visible springs or seeps. They often fall into the category of headwater streams, which are typically isolated from one another, making them susceptible to fragmentation. Although headwater species may have habitat preferences specific to headwater systems, it is still possible and important for them to move from headwaters to headwaters to facilitate gene flow and re-colonization efforts. Mottled Sculpin live in well-oxygenated coolwater streams of moderate to high gradient. Bottom substrate is usually a mix of cobble and gravel, but they can also be found over sand. When sand is the dominant substrate, the sculpins are usually associated with sticks, logs, etc. or some other type of protective cover. They are well camouflaged among the rocks while foraging for aquatic invertebrates, and lay eggs in the interstitial spaces, cracks, and crevices underneath rocks. In the greater Chicago Metropolitan area, Mottled Sculpin are found in tributaries along the Fox River

Small streams, especially in metropolitan areas, are relatively easy to fill in or redirect during development, resulting in a coolwater stream being destroyed and replaced by a warmwater ditch. In other instances, streams are just filled in and forgotten, especially if they are only seasonally filled with water.

Actions:

- Protect natural hydrology, specifically groundwater inputs; monitor groundwater supplies, extractions, and the characterization (e.g., temperature and potential salt contamination from septic systems) of the water.
- Promote recharging of regional aquifers by allowing more precipitation into the ground; encourage use of permeable pavements.
- Encourage restoration of native plants species in forests and prairies and use of native vegetation in urban park and yards to help infiltrate water into the soil.
- Establish baselines and protect and monitor groundwater during watershed land use change and stream modifications to maintain natural hydrology.
- Protect connectivity among headwater systems. Barriers, including low-head dams and culverts, need to be removed or modified to allow fish to bypass them.
- Encourage native riparian vegetation buffers to prevent erosion and overland transport of sediments into streams to prevent sedimentation of bottom substrates and smothering of benthic invertebrates.

Actions

Actions included within the Green Cities Campaign are divided into two distinct sets: Universal Management Recommendations and Targeted Actions. **Universal Management Recommendations are: on-the-ground practices that will benefit Illinois wildlife species, including SGCN, wherever they are implemented with Metropolitan areas.** Anyone that values wildlife and wants to contribute to meeting the overarching goals of the Illinois Wildlife Action Plan should consider implementing these practices where applicable.

For the purposes of the Green Cities Campaign, which is not focused on a specific habitat, **Targeted Actions** have been defined as: **actions that address specific stressors caused by human development and human interaction with natural resources and wildlife.** They are actions that are designed to enhance and restore natural resource function and stability in our built environments in cities and communities, and provide SGCN benefits.

See other Campaigns for additional actions in direct relation to specific habitats and issues.

UNIVERSAL MANAGEMENT RECOMMENDATIONS:

Universal recommendations: on-the-ground practices that will benefit Illinois wildlife species, including SGCN, wherever they are implemented with Metropolitan areas.

1. Increase high quality habitat for SGCN in Metropolitan Areas;
 - Identify potential new core preserves to provide habitat for grassland, woodland and wetland species according to existing conservation plans and through GIS conservation planning. (e.g. - *Chicago Wilderness Green Infrastructure* – Note: copy and paste URL: <http://www.chicagowilderness.org/?page=publicationsnew>)
 - Utilize principles of good preserve design to: establish blocks of habitat capable of supporting area-sensitive species, provide appropriate buffers, utilize genetically appropriate seed and plant sourcing, and maintain or establish landscape linkages (corridors).
 - Identify and expand existing funding sources to proliferate protection of lands of high habitat value for SGCN. (e.g. - *CMAP GO TO 2040 Plan recommendation*.)
2. Restore and manage Metropolitan waters that support SGCN
 - Address altered hydrology, water quantity and quality.
 - Increase connectivity in Metropolitan waterways, including floodplain connectivity where feasible, to increase species diversity and abundance and connect recreational waterways.
 - Remove dams that no longer serve a purpose on Metropolitan rivers and streams to: facilitate fish passage; increase upstream headwaters spawning habitat; mitigate low oxygen conditions and poor water quality in dam pools; remove safety hazards and structurally unsound dams.
 - Address thermal pollution from point source and non-point source delivery.
 - Daylight streams (i.e., uncover some or all of a previously covered river, stream, or stormwater drainage) and naturalize hardscaped stream channels. (e.g. – *American Rivers: <http://urbanomnibus.net/redux/wp-content/uploads/2013/11/daylighting-streams-report.pdf>*)
 - Locate and prioritize headwater stream areas for future protection.
3. Increase habitat connectivity to reduce fragmentation in urban land and water habitats at all scales and facilitate wildlife movement. Use Green Infrastructure principles (Core and Hub) to establish habitat corridors to large open space.
 - Landscape Scale linkages:

- Link large blocks of habitat together with corridor plantings of native habitat along streams and rivers
 - Community /Neighborhood Scale linkages:
 - Protect streams corridors through communities with conservation easements and as openspace
 - add native plantings and native buffer zones along streams, wetlands and lakes
 - install native habitat planting along trails and bike paths
 - work with right-of-way property owners to establish linear habitat corridors
 - Site Scale linkages:
 - Increase areas of native plantings in public and private land and in raingardens and swales, naturalize detention ponds and restore small wetlands.
 - Establish native habitat along streets and parkways and in conjunction with stormwater BMP practices.
4. Investigate causes of initial decline and feasibility of reintroduction success. Species reintroductions may be appropriate where species have been extirpated, where suitable habitat has been reestablished, and where fragmentation prevents re-colonization.
 5. Expand research on the value of Metropolitan Areas for neotropical migrants and other migratory species.
 6. Establish and support large scale monitoring programs (e.g. Bird Conservation Network)
 7. Recognize and manage specific (niche) habitats in Metropolitan Areas that provide for SGCN not found in the rest of the State such as cave amphipods in karst region, Blue-spotted Salamander in northern flatwoods, and Blanding’s Turtle.
 8. Address wildlife species/human interaction with appropriate education and training for mutually beneficial interaction including large carnivore, deer populations and other urban wildlife.
 9. Study urban areas for their importance or role in maintaining Illinois species of SGCN.
 - Species that thrive in and have adapted to urban habitat –i.e. - peregrine falcon, chimney swift, black-crowned night herons
 - Species that have restricted historical ranges that has or is currently being subjected to urban and exurban development.
 - Research Urban Tree Canopy importance for Illinois migratory species.
 - Establish a baseline and inventory of existing Urban tree canopies (e.g. Chicago Regional Trees Initiative (CRTI), The Morton Arboretum - <http://www.mortonarb.org/science-conservation/chicago-region-trees-initiative>)
 - Study wildlife disease and potential zoonotic diseases.
 10. Establish long term monitoring of SGCN and the species they depend on. Provide data to State and local agencies to inform management decisions. Expand and refine existing data sharing networks for transfer of information.
 11. Utilize and train volunteers as stewards and citizen scientists to expand habitat restoration capabilities across the state and to expand collected data.

TARGETED ACTION RECOMMENDATIONS:

Targeted Actions: for the purposed of the Green Cities Campaign **Targeted Actions** are being defined as: **actions addressing specific stressors caused by human development and human interaction with the natural world and wildlife.** These actions are representative of the some of the current urban conservation best management practices that have been shown to enhance resiliency and ecological function in urban areas.

12. Organize under a common conservation goal and coordinate planning efforts.

Need: Urban land-use patterns and rapid land-use change destroys and fragments important wildlife habitats that support SGCN. Establishing under a collective voice will provide a platform for comprehensive priority resource protection, planning and outreach. (e.g. – Vital Lands Illinois: <http://www.grandvictoriafdn.org/how-we-work/how-can-we-overcome-fragmentation-and-unite-behind-a-big-picture-vision>)

If not already existing, establish a Metropolitan Area–wide network of coordination among local, county, state, and federal resource agencies, regional planning agencies, and private conservation groups to promote area-wide comprehensive resource planning and work together to:

- Develop a baseline inventory of the urban area’s natural resources;
- Set conservation priorities and goals, include habitat and species priorities specific to the Urban area (e.g. - Chicago Wilderness *Biodiversity Recovery Plan* <http://www.chicagowilderness.org/?page=publicationsnew>);

Work with the conservation community to assist county and local units of government, citizens and stakeholders to develop strategic planning that protects, preserves and enhances natural resources and their vital ecosystem functions:

- Develop technical assistance programs for local jurisdictions on watershed and natural resource planning (e.g. Heartlands Conservancy – Building Greener Communities: <http://heartlandsconservancy.org/what-we-do/building-greener-communities/>);
- Develop outreach programs for urban area populations on the importance of wildlife and resources, and informal educational opportunities for citizen scientists or volunteers (e.g. Chicago Audubon, Bird Collision Monitors: <http://www.birdmonitors.net/>);
- Provide technical assistance to local park districts and towns for acquisition of natural space and native habitat restoration
- Establish a forest preserve or a township open space district if no local open space entity current exists for access to open space grants or funding
- Developing county comprehensive plans with natural resource policy chapters and resource mapping (e.g. – *Winnebago and Boone Greenways Plan*: <http://ims.wingis.org/Greenways/>)
- Update ordinances to be natural resource sensitive through targeted assistance programs (e.g.- CMAP assessment for five watershed communities: <http://www.cmap.illinois.gov/programs-and-resources/Ita/silver-creek-sleepy-hollow-watershed>)
- Locate and establish funding mechanisms for resource-sensitive planning work (e.g. IEPA Watershed-Based Planning grants)
- Facilitate comprehensive natural resources protection and connectivity in planning with local agencies and jurisdictions:

- Introduce green infrastructure planning concepts (Benedict and McMahon: Green Infrastructure: Linking Landscapes and Communities);
 - Creation of large preserves and protection of priority natural areas and remnant communities;
 - Creation of landscape linkages (including trails and stream buffers) that connect and expand existing natural areas to provide wildlife corridors movement corridors and recreational corridors
 - Establishment of site-based green infrastructure (BMP) practices, native plantings, other.
 - Utilize GIS mapping tools and facilitate in the gathering of resource layers
- Provide a platform for cross-jurisdictional planning through a variety of venues such as workshops, mapping exercises and yearly theme-based seminars.
- Provide accessibility to resource layers through easy-to-use interactive web sites (e.g. Interactive web mapper – The Field Museum: <http://www.fieldmuseum.org/science/special-projects/gis-science-and-education/gis-science-and-education-interactive-maps>)

13. Integrate wildlife and habitat conservation in developed areas.

Need: SGCN have experienced habitat decline and loss in urban areas from local landuse decisions. Increasing technical assistance for local units of government and property owners will help facilitate establishment of wildlife habitat and habitat linkages within developed areas:

- In partnership with local jurisdictions, identify methods to expand protection of high quality habitats and increase urban native plantings, urban tree canopy and forests through watershed planning, grant programs, easements, mitigation funds and other avenues.
- Work with local jurisdictions to develop or redevelop using “conservation design” principles to establish neighborhood/community scale openspace and landscape linkages and trails, for wildlife and humans. Connect to large natural habitats.
- Coordinate with local Land Conservancies; establish a conservancy if needed.
- Coordinate with federal and state resource agencies and private funders and identify match resources to provide greatest wildlife and habitat benefit.
- Encourage inter-agency and inter-jurisdictional coordination through coordinated networking.
- Develop area workshops and educational materials for specific topics and target audiences (e.g. Beyond the Basics Stormwater Management Seminars –The Conservation Foundation, Naperville, IL).
- Integrate native species into the public and private property plantings working with local jurisdictions, DOTs and right-of-way owners.
- Identify, manage/restore via partnerships, and then use ‘non-traditional’ open space lands (closed landfills, utility and powerline rights of way, etc.) to increase available high quality habitat in and around Illinois’ Metropolitan Areas
- Work with and provide technical assistance to individual property owners (i.e. – Conservation @ Home, Conservation @ Work: <http://www.theconservationfoundation.org>)
- Encourage and develop wildlife and natural resource monitoring programs that can continuously update biodiversity inventories. (e.g.- Plants of Concern, Chicago)

Botanic Garden: <http://www.plantsofconcern.org/>; Birds of Concern, Bird Conservation Network: <http://www.bcnbirds.org/trends13/concern.html>)

- Explore/expand the use of programs, Smartphone apps and online venues as a means of promoting citizen scientists, collecting digital data and expanding citizen knowledge base. (National Great Rivers Research and Education Center RiverWatch program: <http://www.ngrrec.org/riverwatch/>)

14. Improve water quality in areas under high development pressure and/or within fragile geographic zones.

Need: Local jurisdictions do not typically examine the lakes, streams and rivers within their boundaries on the comprehensive watershed basis needed (i.e. - looking beyond their community borders) to ensure they institute actions that will sustain and improve water quality and SGCN they support. Actions below address integrated planning methods that will help address resource needs and also aid communities in complying with federal and state regulations for water resources.

- Coordinate with IEPA and USEPA and local jurisdictions on Clean Water Act legislation and work with local NPDES and MS4 (Municipal Separate Storm Sewer Systems) communities to provide workshops, BMP information and education materials that satisfy MS4 Permit requirements and annual reporting. (USEPA MS4 requirements: <http://www.epa.illinois.gov/topics/forms/water-permits/storm-water/ms4/index>).
- Promote development of local subwatershed plans and work to implement projects from subwatershed plans and other integrated natural resource plans.
- Promote riparian development and redevelopment that allows for native buffers, resource enhancement, and increased uses of public river access.
- Work with counties and communities on protection of groundwater-dependent resources such as streams and fens. (e.g. - Class Three Groundwater designations - Illinois Nature Preserves.)
- Promote adoption of resource-sensitive water policies and ordinances at the county and local scale. Actions could include:
 - Deduce pollution and improve water quality of point discharge and non-point discharge (<http://water.epa.gov/polwaste/nps/whatis.cfm>) by implementing the Illinois Nutrient Loss Reduction Strategy guidelines and other guidelines to resolve nitrogen, phosphorus and other nutrient-caused impairments in urban, streams, rivers and lakes.
 - Establish imperviousness limits.
 - Develop *Watershed-wide* river and wetland buffering standards.
 - Protect the floodplain from development.
 - Recreate overflow space for streams in urban areas, and investigate benefits of the FEMA Hazard Mitigation program where appropriate (e.g. McHenry County 2014, Nippersink Creek <http://usasearch.fema.gov/search?query=Nippersink+creek+mchenry+county&op=Search&affiliate=fema>).
 - Address reductions in road salt applications and encourage alternative methods (e.g. Beet Juice applications).
 - Promote preservation of headwater streams as a flood and stormwater mitigation strategy (e.g. - Milwaukee Metropolitan Sewerage District Greenseams program.) <http://www.mmsd.com/floodmanagement/greenseams>).

- Address Combined Sewer Overflow systems (CSO), which are sewer systems that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Separate stormwater from wastewater and infiltrate stormwater.
- Institute stormwater fees and incentives to offset costs of stormwater management.
- For those counties with authority but no current plan, develop a county-wide storm water management plans and ordinance (Illinois P.A. 94-675 (55 ILCS 5/5-1062.2)).
- Develop statewide enabling legislation to allow urbanizing counties to develop stormwater management plans, ordinances and stormwater fees.

15. Integrate natural areas conservation, ecology and environmental education into local Metropolitan area school curricula.

Need: Culturally and developmentally appropriate environmental education is a critical step to ensuring future environmental stewardship.

- Target conservation education to all citizens of Illinois.
- Target early childhood education and provide opportunities for outdoor nature experiences.
- Develop and provide community specific educational and research materials for public and private school use.
- Connect students to wildlife research via citizen science portals and websites. (www.chicagowildlifewatch.org; <http://www.friendsofthefoxriver.org/>)
- Work with Institutions of Higher Education to provide hands-on experience and training in conservation practice and environmental education, to develop a pool of qualified conservation advocates, practitioners, and volunteers.
- Connect citizens with nature in their local communities. Build support for ecosystem protection by partnering with community based organizations to host events and programs focused on local natural communities and wildlife species. (e.g., Openlands: *Space to Grow: Greening Chicago Schoolyards*: <http://www.openlands.org/space-to-grow>)

16. Fill information gaps and research needs, and develop conservation actions to address priority stresses for the Metropolitan area.

Need: Urban areas may serve an increasing role in maintaining and conserving SGCN in the future. Urban areas in Illinois still contain significant resources, and are believed to be playing a key role in regional migration patterns and other dispersal needs for SGCN. A better understand of the Urban area’s role, and future actions necessary to maintain and enhance SGCN within the expanding footprint of Illinois Metropolitans/Urban area is needed.

- Study urban boundaries and growth patterns, in relation to important habitats and species locations, to inform land and water protection decisions.
- Study impacts of road / highway / interstate construction on wildlife habitats and connectivity of movement for wildlife.
- Determine value of urban areas for migration and climate change adaptation for species located and utilizing urban areas.
- Better understand the rural-urban interface and improve actions with respect to deer, mesopredators (e.g., cats, raccoons), apex predators (e.g., cougar) human-wildlife conflicts, invasive species, recruitment, dispersal and survival of wildlife, and infrastructure (e.g., roads)

- Improve our understanding of how urban wildlife species select and move between habitats, and come into conflict with humans, in order to develop growth strategies for urban areas that minimize conflict and protect SGCN species.
- Develop effective strategies for deer harvest in urban and suburban settings to alleviate extreme habitat degradation caused by overpopulation.
- Study the effects of climate change and determine adaptive management steps needed to maintain and enhance habitats to support SGCN.
- Encourage/expand partnerships between public and private landowners and NGOs, volunteer groups, etc. Focus partnerships to harness public interest in monitoring Illinois native species in general, and SGCNs in particular.

17. Increase access to open lands and waters within and near Metropolitan areas for wildlife-related recreation.

Need: Connection to natural resource value comes with contact to the natural world. Increase access to natural lands to help Illinois' urban area citizens experience wildlife adventures and encounters.

- Work with local land holding and open space agencies that share a common recreational mission to create and connect region-wide land and water trails.
- Increase concentration of IDNR naturalist, fishing and other outdoor programs to heavily populated areas
- Increase naturalist and other DNR programs in state parks with high usage by constituents. Make these designated IDNR Priority Outreach work areas.
- Continue to open up private lands for public users (e.g. - IDNR Recreational Access Program (IRAP)).

Management Resources

Numerous resource information links are contained within the body of the Green Cities document. Some of these are repeated and additional resources are listed below.

Natural Division recommendations from IL State Wildlife Action Plan (2005):

<http://www.dnr.illinois.gov/conservation/IWAP/Pages/NaturalDivisions.aspx>

Also - Illinois Natural History Survey Natural Division site

<http://www.inhs.illinois.edu/outreach/natural-divisions/>

Chicago Wilderness Biodiversity Recovery Plan:

<http://www.chicagowilderness.org/?page=publicationsnew>

Illinois Important Bird Areas:

<http://www.habitatproject.org/birds/ibacurrent.html>

Migratory Bird information:

Practices for Urban Areas:

<http://www.fws.gov/migratorybirds/partnerships/urbantreaty/urbantreaty.html>

Species trends:

<http://www.bcnbirds.org/trends13/concern.html#migrants>

The Lake Michigan Flyway: Chicagoland's Role in the Miracle of Bird Migration A Green Paper:

http://www.bcnbirds.org/greenpapers_files/GPflyway.html

http://www.bcnbirds.org/greenpapers_files/GPflyway.html

Grassland Birds:

Grassland Birds - Chicago Audubon: Plan to Meet Illinois Wildlife Action Plan Population Targets for Grassland Species of Concern in Kane County Forest Preserves:

<http://www.habitatproject.org/webdocs/birds/KanePlan2011.pdf>

Monarch Butterfly/Pollinators:

http://www.fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/habitat/

<http://www.xerces.org/pollinator-conservation/learn-about-pollinators/>

<http://monarchjointventure.org/>

Wetlands:

(Paste link, allow for upload time)

<http://www.fws.gov/wetlands/Documents%5C%5CWetland-Resources-of-Illinois-An-Analysis-and-Atlas.pdf>

MITIGATING DEVELOPMENT IMPACTS TO NATURAL RESOURCES

Addressing Impacts of development to water

The Illinois Nutrient Loss Reduction Strategy (2015):

<http://www.epa.illinois.gov/topics/water-quality/watershed-management/excess-nutrients/nutrient-loss-reduction-strategy/index>

Urban Flooding Awareness Act Study (2015):

http://www.dnr.illinois.gov/WaterResources/Documents/Final_UFAA_Report.pdf

Illinois Urban Manual Update (2014):

<http://www.aiswcd.org/illinois-urban-manual/>

Illinois Environmental Protection Agency Green infrastructure Plan and Illinois Department of Natural Resource Addendum (2010):

<http://www.epa.illinois.gov/topics/water-quality/surface-water/green-infrastructure/index>

Smart Growth/Climate/Green Infrastructure publications:

USEPA website keeps an updated list of useful free publications from EPA and Smart Growth Network partners.

<http://www2.epa.gov/smartgrowth/free-smart-growth-publications-epa-and-smart-growth-network-partners>

Urban Climate Adaptation Strategies:

Chicago Wilderness Climate Action Plan for Nature

http://www.chicagowilderness.org/resource/resmgr/Publications/CW_CAPN_Action_Strategies.pdf

Climate Change Update to Chicago Wilderness Biodiversity Recovery Plan

<http://climate.chicagowilderness.org/index.php?title=Introduction#Box1>

Performance Measures

Outcome performance measures are designed to assess the overall impact of undertaking conservation actions on Implementation Goals. Output performance measures are designed to assess how active the program is at working toward the Implementation Goals.

Overarching Goal	Green Cities Campaign Goal	Type	Performance Measure
Habitat Management	1. Protect, manage, and restore lands and waters of importance to SGCN.	Outcome	Acres/miles of restored Urban/Metropolitan areas lands: prairies, forests, woodlands, streams, wetlands.
		Outcome	Acres of invasive species controlled
		Output	Number of established Land Trusts
		Output	Number of established Forest Preserve/Conservation Districts
		Output	Number of Park Districts restoring native habitats
Habitat Management	2. Utilize elements of good preserve design to identify and preserve land that builds and connects large and small blocks of habitat.	Outcome	Number of acres of protected lands
		Outcome	Number of dams removed
		Outcome	Number of conservation easements
		Outcome	Number of hiking/biking trails with natural habitat
Habitat resiliency and connectedness	3. Integrate wildlife and habitat conservation needs into local and regional planning,	Output	Number of local jurisdictions with green Infrastructure/environmental plans and comprehensive plans that include complete habitat mapping.
		Output	Number of Urban/Metropolitan areas with biodiversity and habitat inventories
		Output	Number of local jurisdictions with stormwater fee authority
		Output	Number of counties with stormwater ordinances/authority
		Output	Number of completed Urban watershed plans
Habitat resiliency and connectedness	4. Increase the ecosystem services in Illinois urban areas through functioning and resilient natural habitats, connections	Outcome	Number installed site-based green infrastructure and BMP (raingardens, vegetated swales, pervious surface installations)
		Outcome	Tree canopy increases - including native trees

Habitat resiliency and connectedness	and corridors, and site-scale practices.	Output	Number of environmentally-sensitive Ordinances adopted: "Conservation Design" ordinances; stream buffers; infiltration practices utilizing green infrastructure BMPs native plantings; invasives removal, other.
Public Awareness, Appreciation, Connection	5. Develop citizen awareness of natural resource and wildlife value to promote understanding and support for wildlife conservation.	Outcome	Number of volunteer stewards and volunteer stewardship workdays (for all agencies, entities in Urban/Metropolitan areas)
		Outcome	Number of citizen scientist networks and participants
		Outcome	Number of schoolyard habitat installations
		Outcome	Number of Urban areas open to hunters, anglers
		Outcome	Number of voter-supported openspace referenda
		Outcome	Number - Visitors to FPDs, State Parks
		Output	Number - bird watchers
		Output	Number of local community targeted nature appreciation programs

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Table 6. Definition of terms used in the Green Cities Campaign.

An **ecosystem** is a dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit. Humans are an integral part of ecosystems. (Millennium Ecosystem Assessment)

Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth. (Millennium Ecosystem Assessment)

A **Metropolitan Planning Area** is defined in the Code of Federal Regulations, (23 CFR 450.104) as the geographic area in which the metropolitan transportation planning process must be carried out. This term is further described in 23 CFR 450.308. The MPA boundary shall, as a minimum, cover the UZA(s) and the contiguous geographic area(s) likely to become urbanized within the twenty year forecast period covered by the transportation plan. The boundary may encompass the entire metropolitan statistical area or consolidated metropolitan statistical area, as defined by the Census Bureau.

Metropolitan Statistical Area: Metropolitan Statistical Areas (MSA), as described by the U.S. Census Bureau using 2010 standards, must have at least one urbanized area of 50,000 or more inhabitants. The largest city in each MSA is designated a "principal city." Additional cities qualify if specified requirements are met concerning population size and employment. The title of each MSA consists of the names of up to three of its principal cities and the name of each state into which the metropolitan statistical area extends. MSA information: <http://www.census.gov/population/metro/>

Point source/Nonpoint source pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification. The term "nonpoint source" is defined to mean any source of water pollution that does not meet the legal definition of "point source" in section 502(14) of the Clean Water Act. That definition states:

The term "point source" means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.

<http://water.epa.gov/polwaste/nps/whatis.cfm>

An **Urbanized Area** is a statistical geographic entity designated by the Census Bureau, consisting of a central core and adjacent densely settled territory that together contain at least 50,000 people, generally with an overall population density of at least 1,000 people per square mile. Within the transportation planning community Urbanized Areas are typically referred to as the UZAs.

Table 7. IL Metropolitan Statistical Area counties and population.

Metropolitan Statistical Area	Included IL Counties	Total Population in IL
Bloomington, IL	<i>De Witt; McLean</i>	186,251
Cape Girardeau, MO-IL	<i>Alexander</i>	8,147
Carbondale-Marion, IL	<i>Jackson; Williamson</i>	126,327
Champaign-Urbana, IL	<i>Champaign; Ford; Piatt</i>	231,655
Chicago-Naperville-Elgin, IL-IN-WI	<i>Cook; DeKalb; DuPage; Grundy; Kane; Kendall; Lake; McHenry; Will</i>	8,587,206
Danville, IL	<i>Vermilion</i>	81,463
Davenport-Moline-Rock Island, IA-IL	<i>Henry; Mercer; Rock Island</i>	214,303
Decatur, IL	<i>Macon</i>	110,558
Kankakee, IL	<i>Kankakee</i>	113,170
Peoria, IL	<i>Peoria; Stark; Tazewell; Woodford</i>	378,886
Rockford, IL	<i>Boone; Winnebago</i>	348,574
Springfield, IL	<i>Menard; Sangamon</i>	210,202
St. Louis, MO-IL	<i>Bond; Calhoun; Clinton; Jersey; Macoupin; Madison; Monroe; St. Clair</i>	671,733

Table 8. Population Levels in Metropolitan Statistical Areas, 1960 – 2013.

Metropolitan Statistical Area	2013	2000	1990	1980	1970	1960
Bloomington, IL	186,251	167,231	145,696	137,257	121,364	101,130
Cape Girardeau, MO-IL	8,147	9,590	10,626	12,264	12,015	16,061
Carbondale-Marion, IL	126,327	120,908	118,800	118,060	104,029	88,268
Champaign-Urbana, IL	231,655	210,275	202,848	200,238	195,172	164,002
Chicago-Naperville-Elgin, IL-IN-WI	8,587,206	8,272,768	7,410,858	7,246,032	7,103,510	6,312,517
Danville, IL	81,463	83,919	88,257	95,222	97,047	96,176
Davenport-Moline-Rock Island, IA-IL	214,303	217,351	217,172	243,222	237,245	217,457
Decatur, IL	110,558	114,706	117,206	131,375	125,010	118,257
Kankakee, IL	113,170	103,833	96,255	102,926	97,250	92,063
Peoria, IL	378,886	366,899	358,552	387,732	362,791	334,898
Rockford, IL	348,574	320,204	283,719	279,514	272,063	230,091
Springfield, IL	210,202	201,437	189,550	187,789	171,020	155,787
St. Louis, MO-IL	671,733	671,581	656,987	659,969	665,992	607,274

Table 9. Percent change in total population in Metropolitan Statistical Areas.

Metropolitan Statistical Area	2000 – 2013	1990 – 2000	1980 – 1990	1970 – 1980	1960 – 1970
Bloomington, IL	11.37%	14.78%	6.15%	13.10%	20.01%
Cape Girardeau, MO-IL	-15.05%	-9.75%	-13.36%	2.07%	-25.19%
Carbondale-Marion, IL	4.48%	1.77%	0.63%	13.49%	17.86%
Champaign-Urbana, IL	10.17%	3.66%	1.30%	2.60%	19.01%
Chicago-Naperville-Elgin, IL-IN-WI	3.80%	11.63%	2.27%	2.01%	12.53%
Danville, IL	-2.93%	-4.92%	-7.31%	-1.88%	0.91%
Davenport-Moline-Rock Island, IA-IL	-1.40%	0.08%	-10.71%	2.52%	9.10%
Decatur, IL	-3.62%	-2.13%	-10.79%	5.09%	5.71%
Kankakee, IL	8.99%	7.87%	-6.48%	5.84%	5.63%
Peoria, IL	3.27%	2.33%	-7.53%	6.87%	8.33%
Rockford, IL	8.86%	12.86%	1.50%	2.74%	18.24%
Springfield, IL	4.35%	6.27%	0.94%	9.81%	9.78%
St. Louis, MO-IL	0.02%	2.22%	-0.45%	-0.90%	9.67%

Table 10. Total number of natural communities in Illinois by metropolitan area.

Metropolitan Statistical Area	Freshwater Communities	Subterranean Communities	Terrestrial Communities	Other Ecological Communities
<i>Bloomington, IL</i>	2	0	5	0
<i>Cape Girardeau, MO-IL</i>	2	0	8	0
<i>Carbondale-Marion, IL</i>	3	5	5	1
<i>Champaign-Urbana, IL</i>	0	0	15	0
<i>Chicago-Naperville-Elgin, IL-IN-WI</i>	46	0	109	209
<i>Danville, IL</i>	0	0	6	6
<i>Davenport-Moline-Rock Island, IA-IL</i>	2	0	16	1
<i>Decatur, IL</i>	2	0	4	0
<i>Kankakee, IL</i>	2	1	15	0
<i>Peoria, IL</i>	1	0	37	2
<i>Rockford, IL</i>	4	0	12	1
<i>Springfield, IL</i>	0	0	5	0
<i>St. Louis, MO-IL</i>	11	21	84	0

Table 11. Conservation Opportunity Areas in each Metropolitan Statistical Area.

Metropolitan Statistical Area	Conservation Opportunity Areas
Bloomington, IL	<i>None listed</i>
Cape Girardeau, MO-IL	<i>Cache River – Cypress Creek LaRue – Pine Hills – Western Shawnee – Trail of Tears Middle Mississippi River</i>
Carbondale-Marion, IL	<i>Eastern Shawnee LaRue – Pine Hills – Western Shawnee – Trail of Tears Pyramid – Arkland Landscape Hill Prairie Corridor – South Section Middle Mississippi River</i>
Champaign-Urbana, IL	<i>Vermilion River (Middle Fork, North Fork & Salt Form) & Vermilion R*</i>
Chicago-Naperville-Elgin, IL-IN-WI	<i>Illinois Beach – Chiwaukee Prairie Kankakee Sands – Kankakee River – Momence Wetlands – Pembroke Savanna Lower Fox River Midwin – Des Plaines – Goose Lake Prairie Upper Des Plaines River Corridor Coon Creek – Kishwaukee River – Crow’s Foot Marsh Lake McHenry Wetland Complex</i>
Danville, IL	<i>Vermilion River (Middle Fork, North Fork & Salt Form) & Vermilion R*</i>
Davenport-Moline-Rock Island, IA-IL	<i>Upper Mississippi River</i>
Decatur, IL	<i>None listed</i>
Kankakee, IL	<i>Kankakee Sands – Kankakee River – Momence Wetlands – Pembroke Savanna</i>
Peoria, IL	<i>Middle Illinois River – Meredosia to DePue Mason County Sand Areas</i>
Rockford, IL	<i>Coon Creek – Kishwaukee River – Crow’s Foot Marsh Rock River Sugar-Pecatonica River</i>
Springfield, IL	<i>Mason County Sand Areas</i>
St. Louis, MO-IL	<i>Hill Prairie Corridor – North Section Hill Prairie Corridor – South Section Lower Kaskaskia Bottomlands Middle Mississippi River Pere Marquette Prairie Ridge Landscape Sinkhole Plain Upper Mississippi</i>

Table 12. Total Illinois Nature Preserve acreage in each Metropolitan Statistical Area.

Metropolitan Statistical Area	Nature Preserve Total Acreage
<i>Bloomington, IL</i>	1,485.50
<i>Cape Girardeau, MO-IL</i>	552.29
<i>Carbondale-Marion, IL</i>	1,459.37
<i>Champaign-Urbana, IL</i>	1,501.44
<i>Chicago-Naperville-Elgin, IL-IN-WI</i>	35,195.09
<i>Danville, IL</i>	2,262.47
<i>Davenport-Moline-Rock Island, IA-IL</i>	515.76
<i>Decatur, IL</i>	342.97
<i>Kankakee, IL</i>	1,920.57
<i>Peoria, IL</i>	4,485.51
<i>Rockford, IL</i>	1,407.23
<i>Springfield, IL</i>	367.27
<i>St. Louis, MO-IL</i>	6,427.23

Nature preserves are protected as a part of state law, and they are instrumental in the preservation of Illinois’s native wildlife. The IL Nature Preserves Commission (<http://dnr.state.il.us/INPC/>) works with private and public landowners to maintain and protect these protected zones. A preserve ranges in size from one acre to more than 2,000 acres, and they provide protection to more than 900 different types of endangered threatened animals and plants. These areas are especially useful in areas with higher levels of development and human population since they provide protected zones for wildlife.

Table 13. Ranking of migratory bird species that utilize urban areas. Species are ranked in order of the potential importance that Illinois urban areas might play for the species. Species identified are recommended as prime representatives for the Green Cities Campaign focus areas of the diversity of migrant songbirds, weighted toward Neotropical Migrants and declining species. (*Doug Stotz, The Field Museum/ Michael Patrick Ward, Illinois Natural History Survey*).

1. Golden-winged Warbler steep decline, nests mainly west of Great Lakes, migration-oak woodlands
2. Connecticut Warbler small global pop, wintering range unknown, migration-dense understory, Chicago one of best places to see species in world
3. Bay-breasted Warbler declining spruce breeder, heart of breeding range north of us, migration-oak woodlands
4. Black-throated Green Warbler winters in Mexican mountains, pine breeder, migration-oak woodlands
5. Rusty Blackbird spruce bog breeder, winters SE US, rapid decline, Illinois pops holding up better than most migration - low-lying woodlands (riparian, flatwoods, etc.)
6. LeConte's Sparrow declining grassland sparrow, winters SE US (to so. Illinois), breeds northern Great Plains, migration-dense grasslands
7. Canada Warbler declining spruce breeder, winters base of Andes, under pressure at both ends migration-mostly understory of good woodlands
8. Blackburnian Warbler, conifer breeder, winter mid-Andean slopes, under pressure at both ends migration-oak woodlands.
9. Nelson's Sparrow basically same as LeConte's Sparrow, but in wetter habitats, so probably less at risk
10. Philadelphia Vireo uncommon woodland species, Central American winterer Migration-Oak woodlands
11. Cape May Warbler declining spruce breeder, West Indian winterer, migration-oak woodlands, flowering trees and shrubs
12. Nashville Warbler conifer breeder, Mexican mountains in winter migration - oak woodlands
13. Black-and-white Warbler declining, Central American winterer migration - oak woodlands
14. Mourning Warbler declining, but more widespread and common than Connecticut, migration-understory

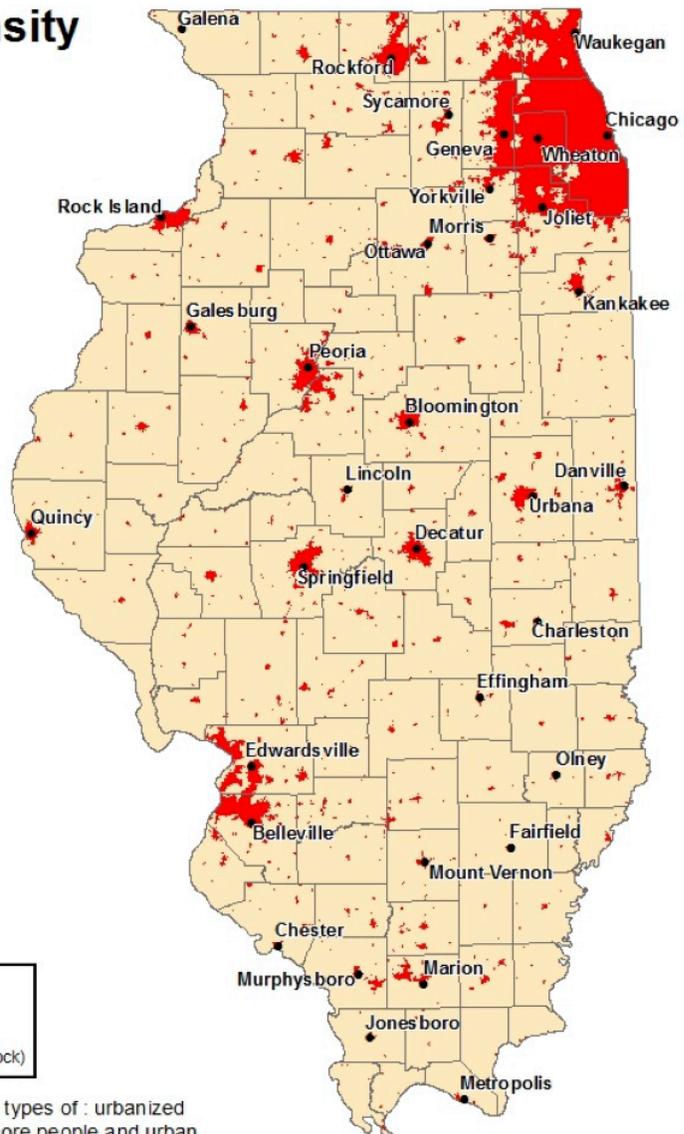
Note: The Bird Conservation Network compiled and published in early 2015, a comprehensive list of ***Birds of Concern*** specific to Chicago metro area, including neotropical migrants that nest in the Chicago metro area, as well as those species that use the habitat available in the area for foraging, as they proceed north to their breeding grounds in the Spring, and pass through on their way south in the autumn. (<http://www.bcnbirds.org/trends13/concern.html#migrants>)

Table 14. 1928 pollinator study by Charles Robertson in Carlinville, IL.

Number of bees found on various plants at Carlinville, Ill. by Charles Robertson					
Plant, common name	Plant, scientific name	Blooming season	Type	Long-tongued bees	Short-tongued bees
Virginia Bluebell	Mertensia virginica	early spring	woodland wildflower	16	2
Spring Beauty	Claytonia virginica	early spring	woodland wildflower	21	37
Jacob's Ladder	Polemonium reptans	spring	woodland wildflower	21	17
Golden Alexanders	Zizia aurea	spring	prairie forb	19	42
Red Bud	Cercis canadensis	spring	tree	22	19
Salix interior	Salix interior	spring	tree	16	43
Foxglove beardstongue	Pentstemon digitalis	late Spring - summer	prairie forb	17	5
Purple Coneflower	Echinacea purpurea	summer	prairie forb	16	7
Swamp Milkweed	Asclepias incarnate	summer	prairie forb	12	6
Man of the Earth	Ipomoea pandurata	summer	prairie forb	14	0
Brown-eyed Susan	Rudbeckia triloba	summer	prairie forb	23	25
Sawtooth sunflower	Helianthus grosseserratus	fall	prairie forb	29	9
Hairy white oldfield aster	Symphyotrichum pilosum	fall	prairie forb	37	53

Adapted by John C. Marlin from Flowers and Insects by Charles Robertson, 1928.

Illinois Urban Areas by Population Density



Legend

- Major Cities
- Urban Areas (Defined by Census Block)

*The US Census Bureau defines two types of : urbanized areas (UAs) that contain 50,000 or more people and urban clusters (UCs) that contain at least 2,500 people, but fewer than 50,000 people. These urban areas also include census blocks with a population of atleast 1,000 people per sq mi with census block groups around this core having a density of atleast 500 people per sqmi with this area containing a population greater than 100 inhabitants.

Figure 7. Urban areas in Illinois based on population density.

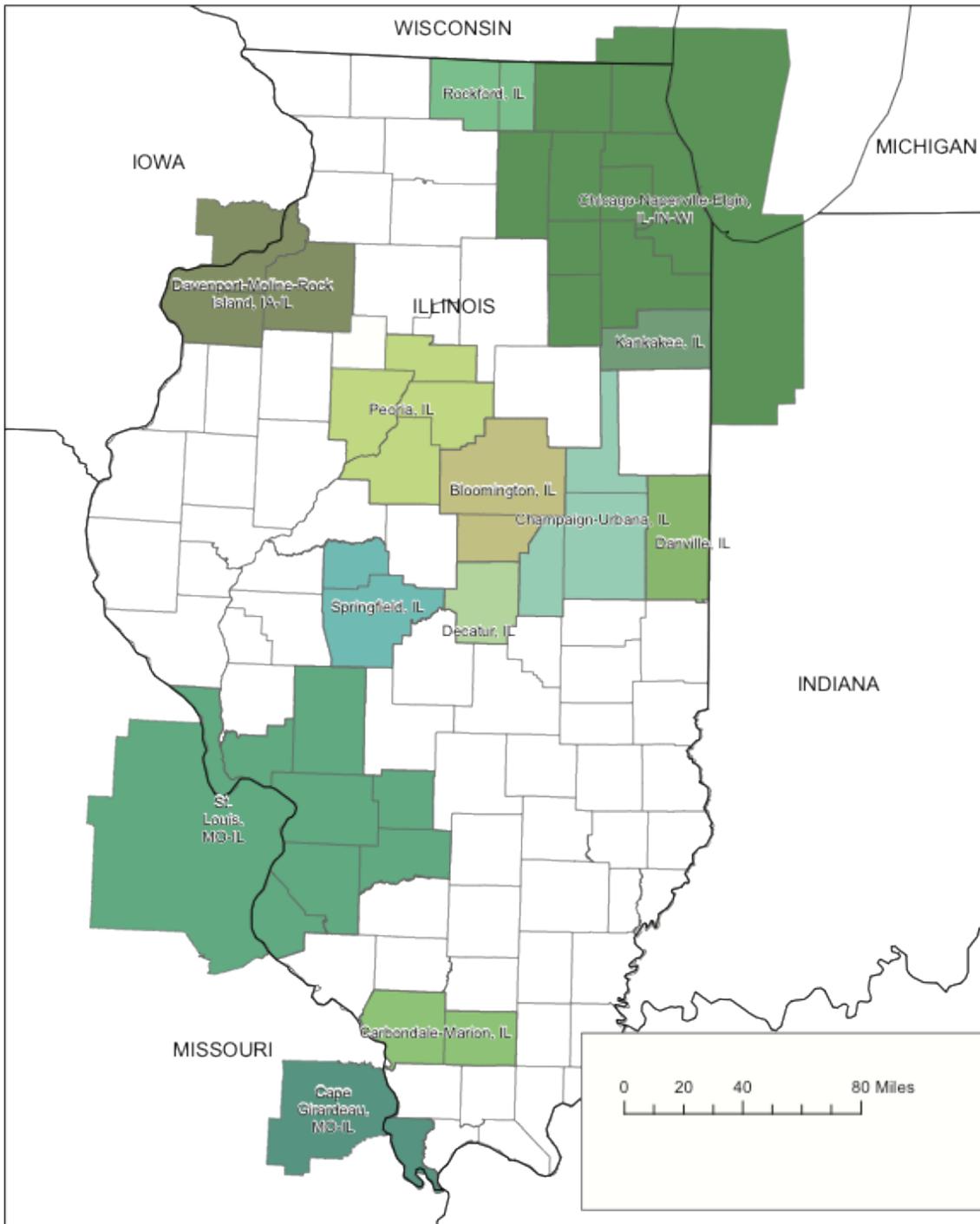


Figure 8. Metropolitan statistical areas in Illinois. These areas have an urban core with a population of 50,000 or more, and can contain multiple counties that either include the core area or are integrated socially and economically into the urban core. These areas are delineated by the Office of Management and Budget (OMB).

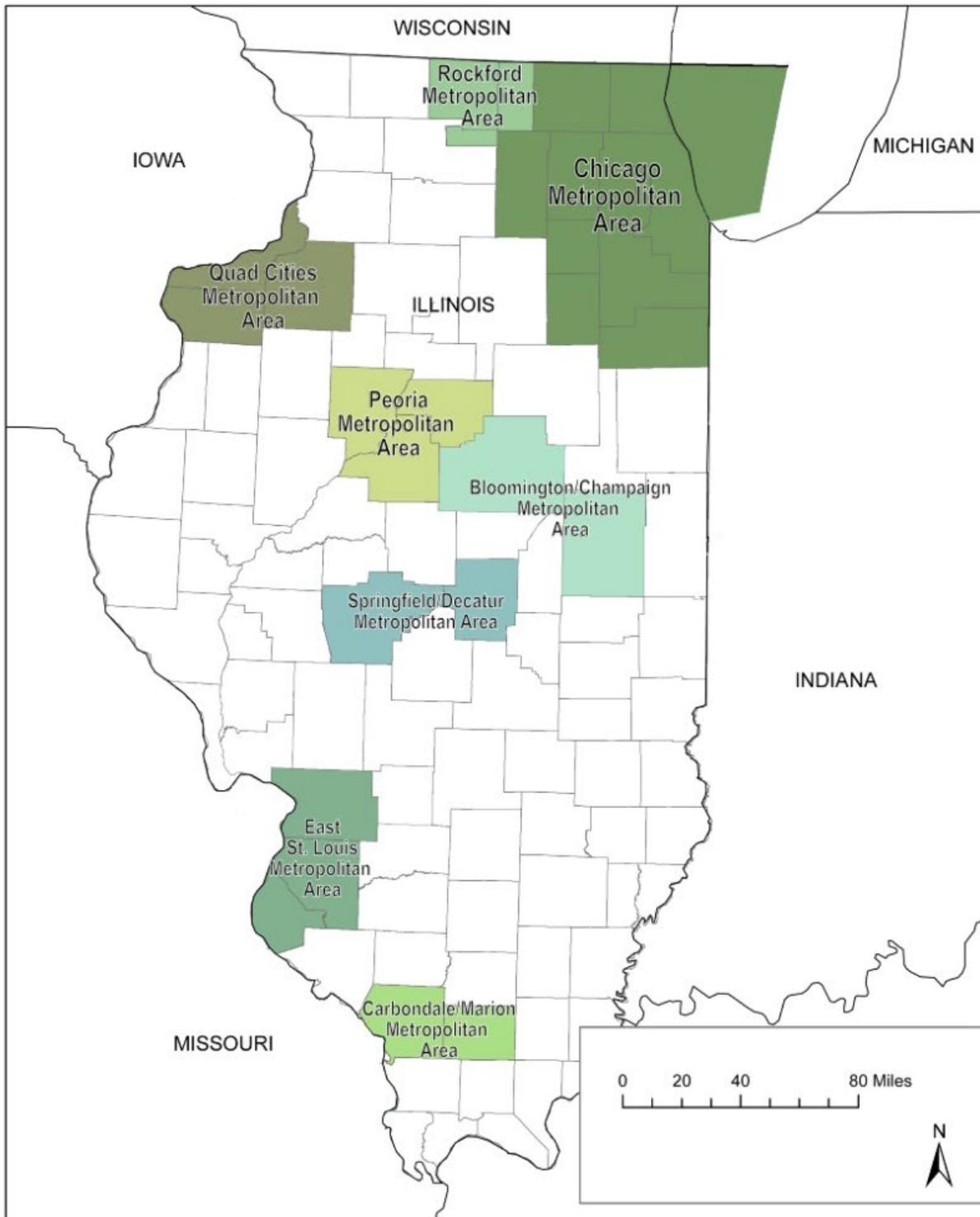


Figure 9. Metropolitan/urban focus areas for the Green Cities Campaign. The whole of the Metropolitan Planning Area for the Quad Cities, Rockford, Peoria, and East St. Louis have also been included in the Focus areas shown.

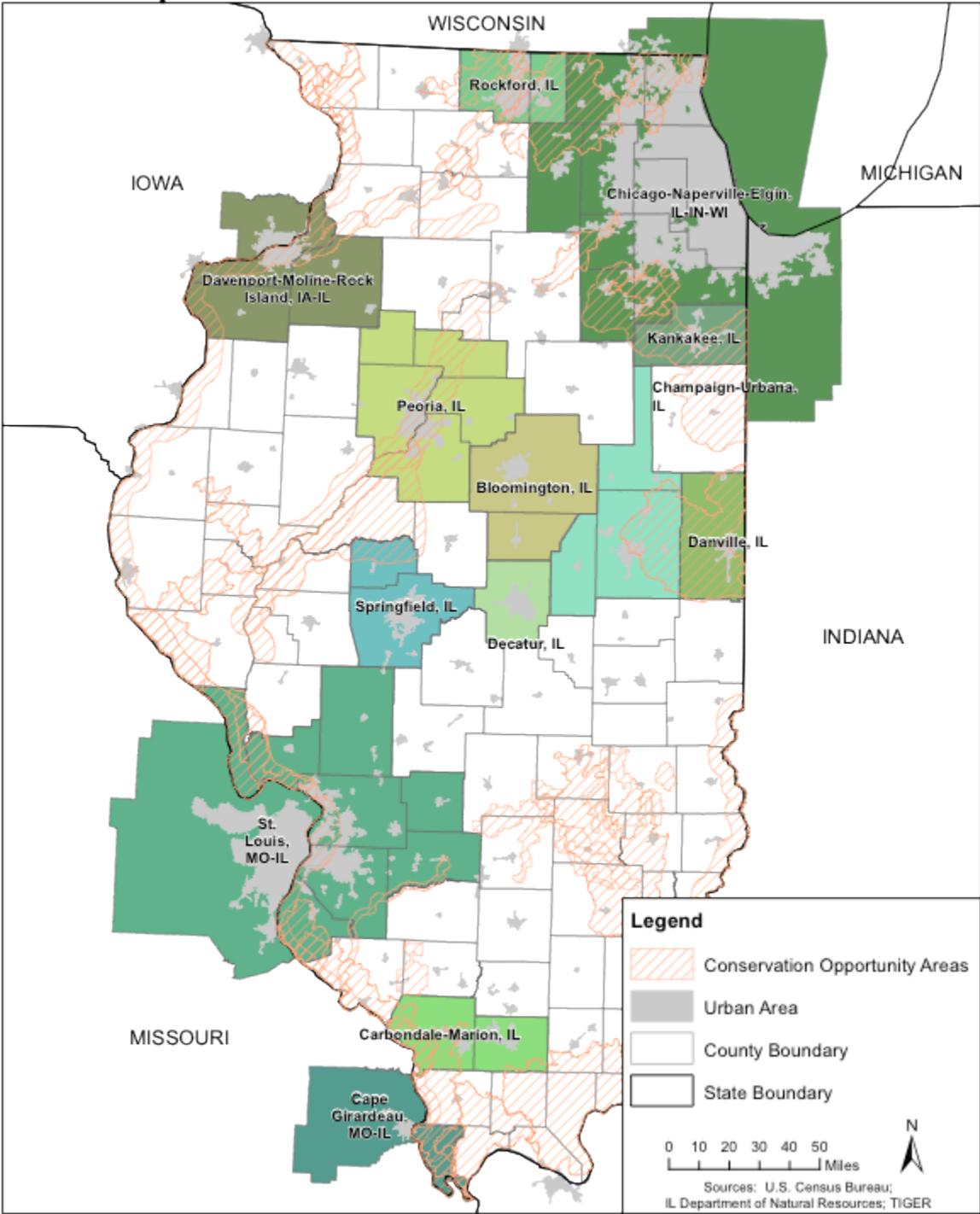


Figure 10. Conservation Opportunity Areas in relation to Metropolitan Statistical Areas and urbanized areas.

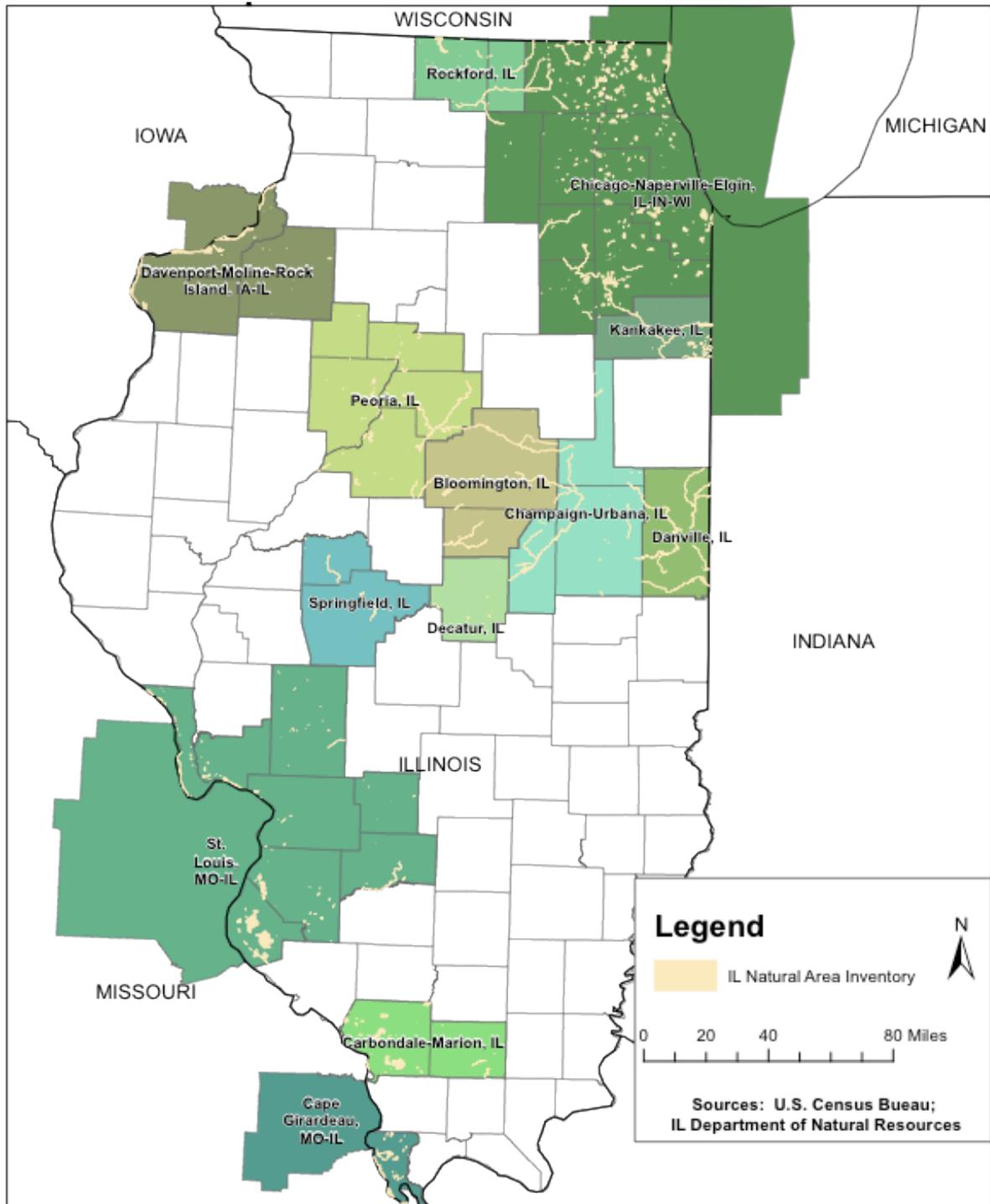


Figure 11. Illinois Natural Areas Inventory sites by Metropolitan Statistical Area.

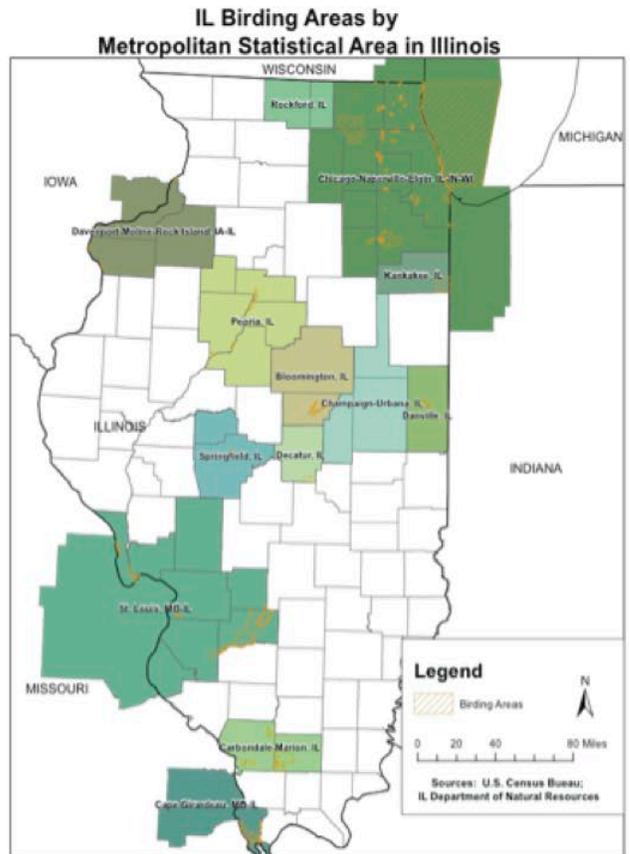
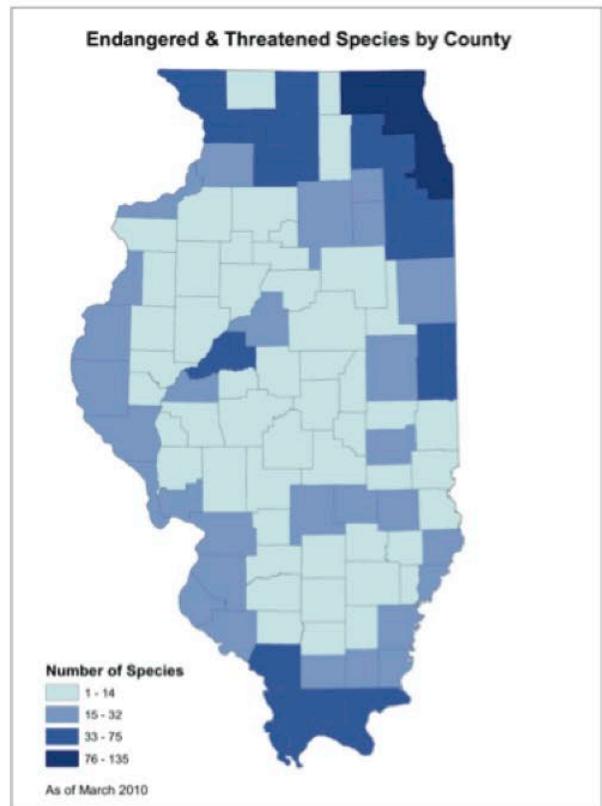
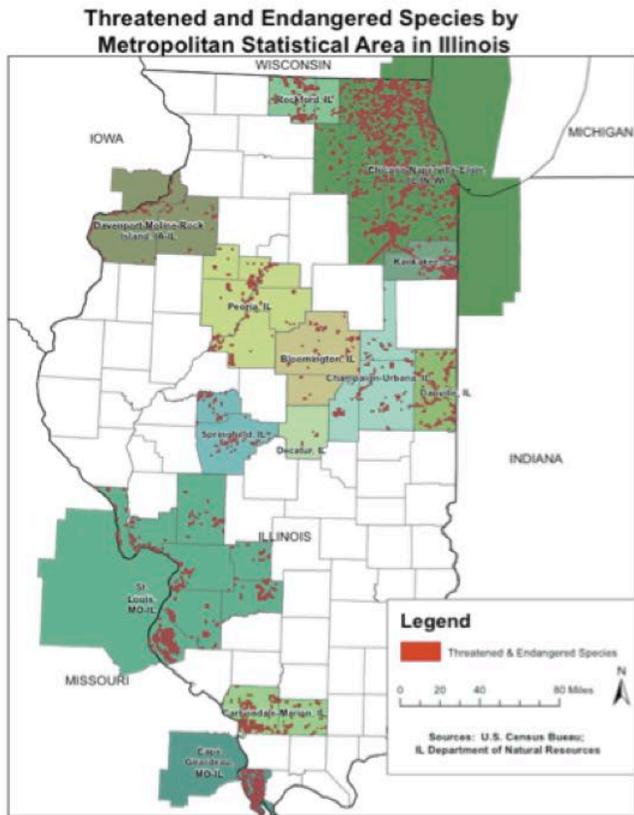


Figure 12. Threatened and Endangered Species information and IL Breeding Areas by Metropolitan Statistical Area.

Illinois 2012 Cropland Data Layer

The Illinois Cropland Data Layer (CDL) is an ongoing statewide land cover mapping program begun in 1999. The purpose of the program is to combine remote sensing imagery, Farm Service Agency reported data and NASS survey data to produce supplemental, unbiased acreage estimates for the state's major commodities and to produce an annual digital, crop-specific, categorized and geo-referenced map product for public distribution. Please note that in no case are farmer reported data revealed or derivable from the public use Cropland Data Layer. For additional information and to download the CDL data for free, please visit the *CropScape* website at <http://nassgeodata.gmu.edu/CropScape/> and the USDA/NRCS *Geospatial Data Gateway* website at <http://datagateway.nrcs.usda.gov/>.

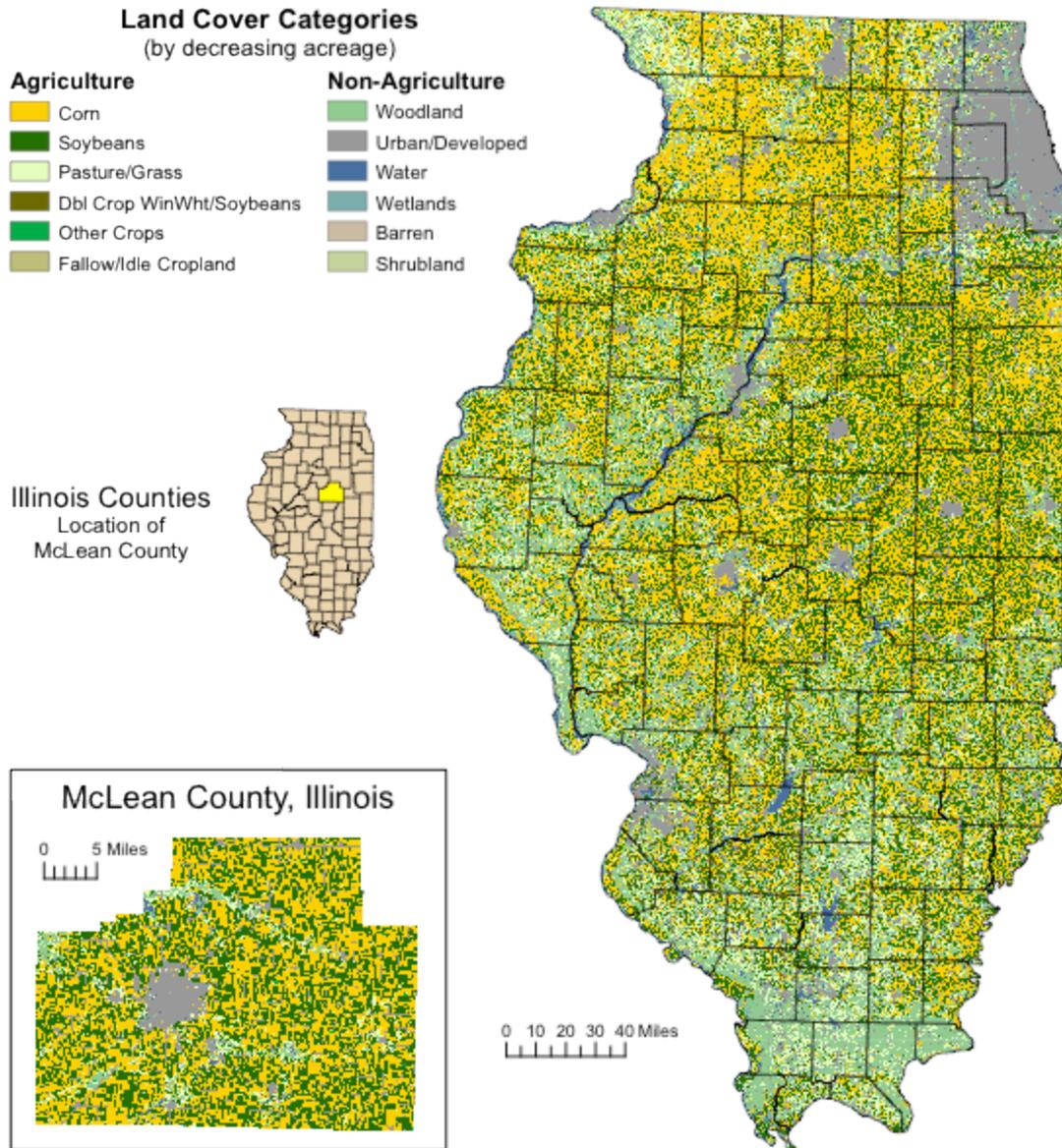


Figure 13. Illinois cropland data from 2012.

Appendix 6a. Status and stresses to Illinois Wildlife Species of Greatest Conservation Need addressed in the Green Cities Campaign and Appendix 6b. Status and stresses to Illinois Plant Species of Greatest Conservation Need addressed in the Green Cities Campaign. Definitions and methods:

Common Name: Commonly recognized name for the species.

Scientific Name: Currently recognized name for the species based on the most recently available literature.

Campaign Habitat: Major habitat type where the species occurs in Illinois.

Specific Habitat: More detail habitat location for species in Illinois.

Historic Status: Number of Counties, or HUC8 watershed for fish and mussels, with records from before 1980.

Current Status: Number of Counties, or HUC8 watersheds for fish and mussels, with recent records (last 20 years).

Trend: Trends were based on the change in distribution of the species by comparing their Current and Historic Status. If a change less than 25% was observed the trend was recorded as 0, changes with magnitudes between 25-49% were coded as +1 (distribution increased) or -1 (distribution decreased), changes greater than 50% were coded as +2 (distribution increased) or -2 (distribution decreased).

Stressors: Each stressor type was rated as either a recognized stressor (1), not a recognized stressor (0), or as having not enough information to make a rating (NMI=Need More Information).

Appendix 6a. Status and stresses to Illinois Wildlife Species of Greatest Conservation Need addressed in the Green Cities Campaign.

Common Name	Scientific Name	Campaign Habitat	Specific Habitat	Historic Status	Current Status	Trend	Habitat Stresses							Community Stresses							Population Stresses				Direct Human Stressors						
							Extent	Fragmentation	Composition-structure	Distribution/Hydrology	Invasives/Exotics	Pollutants-Sediment	Competitors	Predators	Parasites/Disease	Prey/Food	Hosts	Invasive/Exotics	Other Symbionts	Genetics	Dispersal	Recruitment	Mortality	Killing	Disturbance	Structures/Infrastructure					
BIRDS																															
American Bittern	<i>Botaurus lentiginosus</i>	Marsh	Marsh	13	17	-1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1		
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Upland Forest	Forested Stream, Lake	14	66	2	0	0	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	1	1	
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Upland Forest	Forest	74	33	-2	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	
Black-crowned Night-heron	<i>Nycticorax nycticorax</i>	Swamp	Swamp	31	32	0	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	
Bobolink	<i>Dolichonyx oryzivorus</i>	Prairie (Native Grass)	Grassland	53	33	-1	1	1	1	1	1	0	0	1	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	1	
Broad-Winged Hawk	<i>Buteo platypterus</i>	Upland Forest	Forest	42	42	0	1	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	1	
Cerulean Warbler	<i>Setophaga cerulea</i>	Floodplain Forest	Bottomland Forest	36	27	-1	1	1	1	1	1	0	0	1	1	0	0	1	0	0	1	0	0	0	0	1	1	0	0	0	1
Chimney Swift	<i>Chaetura pelagica</i>	Urban	Swamp, Urban	102	100	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	
Common Nighthawk	<i>Chordeiles minor</i>	Urban	Urban, Barren, Grassland	87	76	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	1	1	1	
Dickcissel	<i>Spiza americana</i>	Prairie (Native Grass)	Grassland	101	101	0	1	1	1	1	1	0	0	1	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	1	
Henslow's Sparrow	<i>Ammodramus henslowii</i>	Prairie (Native Grass)	Undisturbed Grass	11	61	2	1	1	1	1	1	0	0	1	1	0	0	1	0	0	0	0	0	0	1	0	0	1	1	1	
Osprey	<i>Pandion haliaetus</i>	Upland Forest	Forested Stream, Lake	10	33	2	0	0	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	1	1	1	
Ovenbird	<i>Seiurus aurocapillus</i>	Upland Forest	Forest	48	53	0	1	1	1	1	1	0	0	1	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	1	
Peregrine Falcon	<i>Falco peregrinus</i>	Urban	Urban, Cliff	3	22	2	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Savanna	Savanna	102	92	0	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0	1	
Sandhill Crane	<i>Grus canadensis</i>	Marsh	Marsh	6	21	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	
Wood Thrush	<i>Hylocichla mustelina</i>	Upland Forest	Forest	101	88	0	1	1	1	1	1	0	0	1	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	1	
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	Marsh	Marsh	13	12	0	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	1	1	1	1	0	1	1	1		
FISH																															
Iowa Darter	<i>Etheostoma exile</i>	Large Reservoir, Creek, Backwater, Swamp	Lake, Stream, Backwater, Swamp with Vegetation	10	5	-2	1	1	1	1	1	1	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	
HERPTILES - Amphibians																															
Blue Spotted Salamander	<i>Ambystoma maculatum</i>	Sedge Meadow	Fish-free Vernal Pool	33	29	0	0	1	1	1	1	1	0	1	0	0	0	1	0	0	1	1	0	0	1	1	0	0	1	1	
HERPTILES - Reptiles																															
Blanding's Turtle	<i>Emydoidea blandingii</i>	Marsh	Nesting in Upland Habitat, Numerous Types of Wetland	31	21	-1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	
Smooth Greensnake	<i>Opheodrys vernalis</i>	Prairie (Native Grass)	Prairie, Old Field	26	14	-1	1	1	1	1	1	0	0	1	1	1	0	0	0	0	1	1	1	1	1	0	1	1	1		

Common Name	Scientific Name	Campaign Habitat	Specific Habitat	Historic Status	Current Status	Trend	Habitat Stresses										Community Stresses							Population Stresses				Direct Human Stressors		
							Extent	Fragmentation	Composition-structure	Distribution/Hydrology	Invasives/Exotics	Pollutants-Sediment	Competitors	Predators	Parasites/Disease	Prey/Food	Hosts	Invasive/Exotics	Other Symbionts	Genetics	Dispersal	Recruitment	Mortality	Killing	Disturbance	Structures/Infrastructure				
INVERTEBRATE - Lepidoptera (Butterflies & Moths)																														
Monarch Butterfly	<i>Danaus plexippus</i>	Prairie (Native Grass)	Prairie, Meadow	NMI	NMI	NMI	1	1	1	1	1	1	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	
MUSSELS																														
Black Sandshell	<i>Ligumia recta</i>	River	Riffle, Gravel or Sand	32	15	-2	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1		
Pistolgrip	<i>Tritogonia verrucosa</i>	River	Sand, Gravel, Muck	38	29	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1		
MAMMALS																														
Franklin's Ground Squirrel	<i>Poliocitellus franklinii</i>	Prairie, Marsh	Tall/Mid-Grass Prairie, Marsh Edge, Field/Forest Edge	14	10	-1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1		

Appendix 6b. Status and stresses to Illinois Plant Species of Greatest Conservation Need addressed in the Green Cities Campaign.

Common Name	Scientific Name	Campaign Habitat	Specific Habitat	Historic Status	Current Status	Trend	Habitat Stresses							Community Stresses							Population Stresses			Direct Human Stressors		
							Extent	Fragmentation	Composition-structure	Distribution/Hydrology	Invasives/Exotics	Pollutants-Sediment	Competitors	Predators	Parasites/Disease	Prey/Food	Hosts	Invasive/Exotics	Other Symbionts	Genetics	Dispersal	Recruitment	Mortality	Killing	Disturbance	Structures/Infrastructure
PLANTS																										
Climbing milkweed	<i>Matelea decipiens</i>	Floodplain forest	Floodplain forest, flatwoods	2	2	0	1	1	1	1	NMI	NMI	1	1	NMI	NMI	NMI	1	NMI	NMI	1	1	NMI	1	1	1
Narrow-leaved green milkweed	<i>Asclepias stenophylla</i>	Prairie, glades	Loess hill prairie, limestone glades	3	2	-1	1	1	1	1	NMI	NMI	1	1	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	1	1	1
Mead's milkweed	<i>Asclepias meadi</i>	Prairie	Eastern mesic prairie	9	4	-2	1	1	1	1	NMI	1	1	1	1	NMI	NMI	1	1	1	1	1	1	1	1	
Oval milkweed	<i>Asclepias ovalifolia</i>	Prairie and sananna	Northern prairie, savanna	5	1	-2	1	1	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	NMI	1	NMI	1	NMI	NMI	1	1
Woolly milkweed	<i>Asclepias lanuginosa</i>	Prairie	Dry gravel prairie	13	5	-2	1	1	1	1	NMI	1	1	1	1	NMI	NMI	1	NMI	1	NMI	1	1	1	1	1