



Celebrating and Enhancing Biodiversity

in the Champaign-Urbana-Savoy-University of Illinois
Metropolitan Area



Illinois Extension

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

“The care of the Earth is our most ancient and most worthy, and after all our most pleasing responsibility. To cherish what remains of it and to foster its renewal is our only hope.”

~Wendel Berry



“Native ecosystems in Illinois play important roles in reducing the adverse effects of climate change and provide many other benefits to people. Given the widespread conversion of these ecosystems to other land uses in Illinois, the first priority must be to reduce current rates of ecosystem destruction and degradation in the state.”

~An Assessment of the Impacts of Climate Change in Illinois, 202

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Background

The Convention on Biological Diversity defines “Biological diversity” as the variability among living organisms from all sources, including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”

According to the Kunming-Montral Global Biodiversity Framework, “Biodiversity is fundamental to human well-being, a healthy planet, and economic prosperity for all people, including for living well in balance and in harmony with Mother Earth. We depend on it for food, medicine, energy, clean air and water, security from natural disasters as well as recreation and cultural inspiration, and it supports all systems of life on Earth.”

And yet, the biodiversity crisis on Earth presents serious threats to human health, livelihoods, food systems, and climate change.

Conscious management of urban environments, with an eye toward improving plant species biodiversity with an appreciation of the importance of biodiversity to habitat, can play an important role in restoring native species habitat, mitigating climate change, and improving human health and community resilience. Improved biodiversity can improve walkability, quality of life, and may improve community cohesion. Increased biomass means an increase in sequestered carbon and can reduce heat island effects and nighttime temperatures. Overall, improved biodiversity helps create resilient communities.

This report aims to provide ideas and strategies community organizations can use to increase native plant species and adapt to our changing climate.

Our goal is to foster collaborations whose actions will establish the Champaign, Urbana, Savoy, and University of Illinois campus region as an innovative leader at the intersection of community-University partnerships and environmental sustainability. This report can be a roadmap for biodiversity best management practices, foster a living-learning lab for applied research to enhance local biodiversity, and promote the metro region as a leader in biodiversity innovation.

This report is written for local government entities and university researchers and students. It is a celebration of achievements, and suggests opportunities, goals, and strategies. Recommendations for privately owned land are included to move beyond what can be done in the public sector and to expand the range of impact. Recommendations for large-scale agriculture and regenerative agricultural practices are not addressed.

Champaign-Urbana-Savoy-University of Illinois Metropolitan Region

The region comprises the Champaign-Urbana-Savoy-University of Illinois metropolitan area. It is home to the University of Illinois, and the communities of Champaign (population 89,144), Urbana (population 38,681), and Savoy (population 8,823). The region is rich in agricultural production and sits at the intersection of two interstates, making transportation efficient and accessible.

According to Kenneth Robertson of the Illinois Natural History Survey, prior to development, Champaign County was 93.7% prairie and 6.3% forest. Prairies in Illinois have been reduced to 0.01% of the original expanse.

What is a Biodiversity Plan?

Biodiversity plans can be titled with any number of terms, including Biodiversity Action Plan (BAP), Biodiversity Management Plan (BMP), or Biodiversity Recovery Plan (BRP). A short list of examples include the [University of Cambridge's Biodiversity Action Plan](#); the [Chicago Wilderness and Its Biodiversity Recovery Plan](#); and the [University of Sydney Biodiversity Management Plan](#).

Most biodiversity plans acknowledge that institutions and communities play a significant role in protecting and conserving wild areas; work toward halting biodiversity declines in nature; and suggest strategies to restore or improve ecosystems and habitats to long-term viability for priority or at-risk species.

A biodiversity plan may be an aspirational guide for exploring how to use open spaces on public and private lands to meet biodiversity goals while aiming to minimize the impact of development and the built environment. It can be considered a recovery plan for lost diversity, a celebration of biodiversity and the assets that the region has achieved, and a reference for ways to guide future development and redevelopment. A multi-municipality plan is an opportunity to unite the region around a set of goals.

Why should we have a plan?

Conserving biological diversity is not only important for plant and animal species, but offers social benefits such as recreation, cultural activities, and even mental health improvements. Creating recommendations and small changes to practices already started in cities can significantly increase biodiversity in cost effective and sustainable ways. By doing this, cities can help provide valuable stopover habitat for migratory species and increase the overall habitat for non-migratory species of animals and plants.



Methods

Through key informant interviews and snowball sampling, 44 individuals from the community provided insight that shaped the overall goals and strategies presented here. These people were surveyed individually and in small groups to better understand the region's biodiverse assets and needs to create informed decisions on strategies and goals. Notes were collected from each meeting and compiled into the achievements, opportunities, goals, and strategies sections below.

Habitats

There are three habitat types historically found in the region: deciduous forests, prairie, and wetlands/aquatic (mainly rivers and streams). Looking at, expanding, and publicizing the major habitats historically found in central Illinois could be beneficial for ecotourism, biodiversity, and general livability. This section also addresses patch and coordinator frameworks.

Deciduous Forests and Woodlands

Although forest habitat can be difficult to improve in the short term, protection and management of woodlands and individual trees are feasible short-term goals to improve habitat. Trees can take 200 years to fully mature. Other strategies to improve woodland habitat can be implemented in a shorter time frame, such as increasing woodland wildflower patches, planting the most suitable species of trees, dedicating land for future woodland groves, and continuing support for street tree programs.

Urban street trees support many species of birds and insects. In the region, there are more urban street trees with a larger percentage cover than are found in Busey Woods in Urbana. Dr. Michael Ward, ornithologist, stated that the urban tree canopy directly impacts the abundance of warblers, owls, and other species of birds observed in the area. Trees offer support for wildlife, not only through pollination of their flowers, but also their capacity to provide food for species of birds and mammals. Hardwood trees host hundreds of species of moths and other insects that birds and bats eat. Trees also provide an array of fruits that birds and mammals can eat.

Because urban tree canopy offers support for a variety of species, it is a beneficial tool to increasing diversity in areas that require open understory for gathering space and recreation. It is also important to consider understory vegetation and ground cover where open space is not required. Under many urban trees lies turf grass, mulch, and pavement. Mulched beds around tree trunks can be planted with spring ephemeral wildflowers that offer the first bright burst of color for people and pollinators. These plants usually completely retreat into the ground until the next spring and the space would revert to a typical mulch bed. Understory shrubs, such as witch-hazel, offer fall color, support for native wildlife, and can be grown in shady conditions.

Prairie Habitat

Prairie habitat has increasing support in the region with initiatives such as pollinator gardens and monarch waystations growing in popularity. Larger scale, reconstructed prairies in the region include Meadowbrook Park and Porter Park. Moving away from turf, toward other species of warm season grasses and perennial herbaceous forbs, will expand prairie habitat. This can be accomplished on a large scale or with multiple smaller residential pollinator friendly gardens. Promoting these native prairie plants through educational materials, native plant sales, and demonstration gardens can motivate property owners to engage in the practice and will help with accessibility of native prairie plants.

While establishing stable, large-scale prairie restorations can be resource intensive (requiring extensive invasive control and multiple years to establish), smaller garden plots of prairie habitat can be installed in one season with noticeable ecological benefits, such as pollinator support, observed the same year they are planted. Providing the unique food requirements of different pollinators will increase diversity. Monarchs have a unique relationship with milkweeds, but fewer people know that a certain species of weevil relies on wild indigo, or that swallowtail butterflies rely on plants in the carrot family, such as golden alexanders. A diverse selection of prairie plants can be considered in larger plantings to account for these unique and less known interactions.

Wetland habitat

Wetland habitat is the least abundant of the three habitats in the region. It is also the fastest and easiest habitat to improve. Flooded fields, monitored for invasives, can provide wetland habitat for a variety of migratory birds.

Wetlands can be installed on a small scale but provide benefits on a larger scale. For example, migratory bird species require a larger space than urban rain gardens as stop over habitat. When possible, larger wetlands should be considered outside of the urban core to allow birds to recognize the habitat.

Wetlands require a source of water, either naturally or artificially. Stormwater from subdivisions and streets can be directed toward a larger wetland to help mitigate flooding in the cities and create a source of water for the habitat. Many neighborhoods are built in wetland type of habitats and require detention ponds to mitigate basement and street flooding. This extra water can be directed to a larger wetland. Multiple neighborhoods could direct their extra water toward a single wetland through green or grey infrastructure. Another option is directing tile drainage water toward wetlands. Wetlands improve water quality, removing nutrients and other by products from urban environments from water before it enters the larger watersheds. This process can help reduce larger, nationwide problems such as gulf hypoxia. The land just west of Champaign floods often and could provide stormwater detention from neighborhoods and improve biodiversity.

Flooded agriculture fields, or “fluddles,” are valuable to migratory birds. These are usually agriculture fields that regularly flood and are not very productive for crops. Fluddles could be transformed into constructed wetlands. Making permanent wetlands out of fluddles will provide breeding habitat for migratory birds.

The size of these wetlands is not as important as size of forest because the species are less sensitive to edge effect or contrasting environments along edges of habitat. Larger wetlands will have a larger buffer for changing conditions and capacities to accommodate various ecological processes. Half a mile by half a mile fluddles have successfully attracted various birds and would be a suitable size. Waterfowl and shore birds particularly will be attracted to these sites.



Patch and Corridor Framework

Another way to think about expanding habitats is through the patch and corridor framework. It is important to look holistically at the region to create a biodiverse, urban ecosystem, rather than focusing on smaller parcels of recreation/park/habitat space. Cities have the potential to link the fragmented pieces together, ultimately creating one large patch of habitat. Creating new spaces of habitat is important, but linking these pieces together to create a larger system of suitable habitat is equally as important. In larger spaces, wildlife can safely roam, forage, and find mates.

Each municipality has a park patch that is over 40 acres. There are a few parks in the region that are over 60 acres. These larger parks act as larger sources for and anchor to the ecosystem. Between these larger parks are smaller supporting patches, including home landscapes, pocket parks, and pollinator patches. These smaller patches are vital for connecting the region because they offer support for flora and fauna in a steppingstone fashion. Species can disperse to these smaller patches from the large ones so long as they are within a reasonable, species-specific distance.

Creating two woodland habitat patches and two prairie habitat patches per city block would be an ambitious goal. Wildlife patches and corridors have been widely studied and extensively reported on. Plots can be relatively small; 100-200 square feet is suitable for many species. Each patch should include a temporal scale of blooms, with different species of plants in bloom from early spring to late fall. Woodland and prairie patches should focus on plants typically found in those habitats. Patches next to high traffic areas should have some aesthetic characteristics for public acceptance and be maintained to fit city ordinances.

Corridors are planted passages that connect patches to create a mosaic. Corridors can be planted green streets, bike trails, or old railroad paths. By connecting large and small patches with corridors, most species will be able to traverse the entire region without running into barriers of urban fragmentation. Increasing the number of planted biking/hiking trails and green streets will expand the corridor network, ultimately linking more patches together, and unifying the urban ecosystem. An integrated biking/hiking/walking/jogging trail network will also expand the recreational opportunities.

Community Assets

The region is already rich with examples of biodiversity success stories. Below are some community assets identified during key informant interviews.

Urbana

- Urbana maintains its Tree City USA designation. Urbana was the first Illinois community to receive the Tree City USA designation in 1976, the program's inaugural year, for work completed in 1975.
- The Sola Gratia farm in east Urbana employs organic production methods with 125 varieties of 50 different vegetables, herbs, and fruits.
- Many private landowners have biodiverse yards and tree diversity, in the right of way and in their yards.



The City of Urbana has programs that support biodiversity, including incorporation of native and nativar (a cultivar derived from native parents and bred for a particular trait, typically resulting in a loss of genetic diversity) species into public landscaping, seed collection and exchange at the Urbana Free Library. Urbana participates in the Midwest Grows Green program to reduce or eliminate synthetic fertilizers and pesticides.

Urbana’s ordinance and zoning requirements support biodiversity.

- Newly permitted parking lots have a required number of shade trees (one shade tree per nine parking spots for lots with more than 20 spaces).
- Zoning requires open space in residential, business, and conservation districts.
- In Planned Unit Developments, residents can apply for waivers to certain codes if they incorporate beneficial practices such as stormwater management best management practices.
- Stormwater Utility Fee Credit and Incentive Manual supports green infrastructure installations. Residents can apply for incentives and credits to stormwater utility fees by installing green infrastructure practices such as rain barrels and rain gardens.
- Landscape ordinances carve out exceptions for residents to grow plants taller than otherwise allowed.
- Guidance on low mow is included in ordinance.

Members of the public serve on the Urbana Tree Commission, is a city commission charged with providing advice and consultation to the City Arborist on policies concerning selection, planting, maintenance, and removal of trees, plants and shrubs; the establishment of educational and informational programs concerning vegetation; and policies and procedures regarding the duties of the Arborist.

Urbana has constructed model bioswales, including one on Broadway Avenue, and plans to naturalize streams systems, including rock dams and rock weirs, to reduce velocity and improve aquatic habitat. The city participates in community activities such as Boneyard Creek Community days and other outdoor events on Boneyard Creek.



Urbana Park District

The Urbana Park District’s [Climate Action, Resilience, Education, and Sustainability](#) (CARES) Plan outlines goals, objectives and strategies related to increasing and supporting biodiversity. One of the plan’s three pillars is “Protecting and Strengthening Our Natural Environment” which “reinforces the Urbana Park District’s responsibility to care for the health of humans, plants, animals, ecosystems and the climate—by reducing our carbon footprint, stewarding biodiversity and natural areas, and improving air and water quality.” Goal 3 of that pillar is to “Steward biodiversity through responsible care and expansion of natural areas.” Objectives to meet this goal include:

- Increase the amount of quality naturalized areas
- Employ best practices in sustainable maintenance of parks and natural areas
- Develop a native, local ecotype, plant propagation program
- Enhance community-wide biodiversity

Here is some of the work that UPD has done recently:

- Maintains a [list of species found in Busey Woods/ Crystal Lake Park](#) habitat complex; over 2,000 species cataloged so far.
- Assessed the total number of acres of natural areas by habitat type:
 - Prairie: 147.67 acres
 - Woodlands: 122.17 acres
 - Wetlands: 38.29 acres (includes bioswales, rain gardens, hemi-marsh, basin, lake, shoreline, wetlands and streams)
- Creating custom management strategies for each unique habitat zone within different natural areas
- Developing an Integrated Pest Management Plan that specifies methods for minimizing environmental impacts, including using the least toxic options first (typically by manual removal)
- The Urbana Park District has reduced mowing—both in frequency and area (especially in locations where spring wildflowers are growing) -- and is committed to building up pollinator habitat including through native seed collections and redispersal, as well as training maintenance crews on native plant identification.
- Wetlands, bioswales, and habitat restoration and conservation projects have taken place at:
 - Weaver Park (prairie reconstruction, wetlands, and some of the original Big Grove woodlands)
 - Perkins Road Wetland This unique wetland complex has diverse water features and topography which allow biodiversity to thrive. The spring water that fills the marsh and sedge meadow draws in waterfowl and other birds during spring migration. The proximity to the Saline Branch allows for interesting interactions such as otter and kingfishers. The wet areas of the dog park now drain to the marsh to help replenish the water levels and allow mud to dry faster. This addition helps to keep the water present all year.
 - Meadowbrook Park (including 80 acres of recreated tallgrass prairie)
 - Anita Purves Nature Center
- Busey Woods
- Crystal Lake Park
- Crystal Lake Park has gone through many transformations throughout its long history. The most recent included removal of invasive brush and reshaping the shoreline to protect against erosion. Native plants now extend from the water up the slopes. The diverse range of species not only help pollinators but also aquatic life with the new plant structure in the water. With a watershed that includes Carle Hospital and the Champaign County Fairgrounds, it was important to manage the runoff from parking lots and roads and try to treat the water before it enters the lake. This is done by using hydrodynamic separators, curb cuts, sediment basin, vegetated floating islands, and a half-acre rain garden that collects and treats water from the Champaign County Fairgrounds parking lots.
- Shares information about [Natural Areas Projects](#) publicly.
- Maintains a list of [local green initiatives](#).

Champaign

In Champaign, businesses are embracing biodiverse landscaping and inspiring others to use more native plants in landscaping projects. Examples include:

- The Carle Foundation Hospital complex on Staley and Curtis Roads includes overlay zoning requirements to allow native vegetation and natural water management practices.
- Guido's Bar and Grill in downtown Champaign asked the city's horticulturist for a native planting in the right of way. The planting has inspired others to ask for native plantings.

Local schools are including biodiverse features in their landscaping.

- At Bottenfield Elementary school, the Parent and Teacher Association installed a biodiverse planting in front of the school and a green infrastructure feature with native plants in the back. The PTA supports fundraisers for ongoing maintenance, and parents and teachers maintain the garden.
- The Champaign Unit 4 School District Administration Building has a rain garden in the right-of-way.

Boneyard Creek is a 3.3-mile waterway that drains much of the cities of Champaign and Urbana. It is a tributary of the Saline Branch of the Salt Fork Vermilion River. Community members participate in an annual cleanup. The creek is used for educational activities. Boneyard Creek activities include:

- Taking fish and mussels out of the creek, temporarily, to use in educational programs.
- Removing litter in and around the creek.
- Providing opportunities for dialogue around urban conservation.

The City of Champaign has constructed several stormwater-management retrofit projects to better handle storm water runoff from rain events. Projects have space and native plantings, increased recreational space, and reduced the cost of maintenance. The city strives to maintain the properties as community amenities and provides signage at some sites to promote understanding. When possible, the City uses pollinator friendly plantings, transitions right of ways from junipers to natives, and reduces fertilizer use. City retrofits and studies include:

- Healey Street Detention Basin was the first retrofit. It has proved difficult to maintain and has erosion problems.
- 2nd Street Basin has five types of turtles, bass, shiners, chubs, and serves as a stopover for waterfowl and other birds (such as herons and kingfishers). Park amenities are available.
- Glenn Park serves as stormwater detention and includes native plants and wetland plugs.
- Preservation Pond has two detention basins and rain gardens.
- Scott Park has diverse plants and bird activity.
- There is a dry basin on Mattis Avenue.
- Two smaller rain gardens have been installed on Miller Street and Garfield Street. The city supported the installation of some smaller residential rain gardens.
- New watershed improvements are being constructed for drainage and will include native plantings instead of grass.

- Champaign is undertaking a RES Bioassessment as part of the MS4 Monitoring. The bioassessment will evaluate the stream ecology with a focus on the Boneyard Creek, Copper Slough, and Phinney Branch.
- The loss of trees due to Dutch Elm Disease and the Ash borer provides an opportunity to replace trees with a wider diversity of tree species. The city now maintains a 30/20/10 family/genus/species ratio for trees.

Champaign Park District

The Champaign Park District provides green trails and space with most natural areas planted with prairie ecosystems. The 2019 – 2029 Comprehensive Plan informs management and planning. The park district has three to four full time arborists who take care of the current tree population and plant about 200 trees per year to comply with the Tree City USA requirements. The Champaign Park District is considering the impacts of climate change in new tree plantings. The past five years have seen increased growth. The first large scale natural park was started eight years ago. Park sites include:

- Human Kinetics Park, which includes a dry detention pond and low mow management.
- Robert C. Porter Park has a pond with native plants near the water. This park was created in partnership with the Urbana & Champaign Sanitary District.
- Heritage Park was originally invaded with invasive species. It is now under control and has been transitioned to high quality grasses and forbs. Master naturalist classes use the park as a teaching tool.
- Commissioner Park covers 20 acres, 15 in low mow. This is part of the District's Greenway Master Plan.
- Smaller park-pockets are being incorporated.
- The Champaign Park District has carried over the Urbana Park District standards.

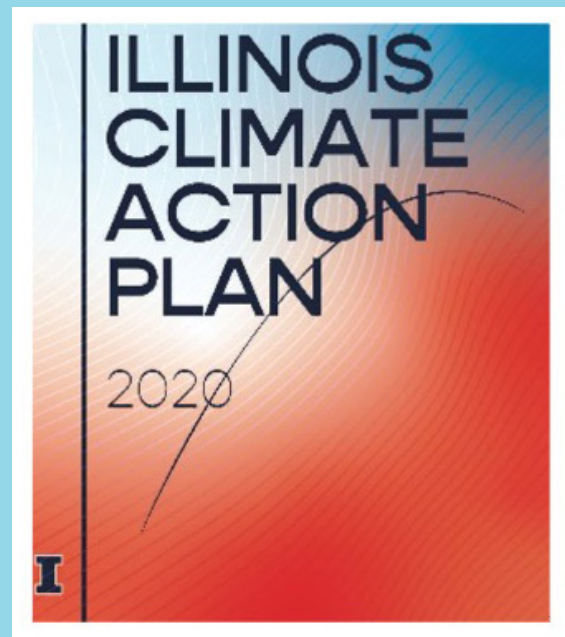
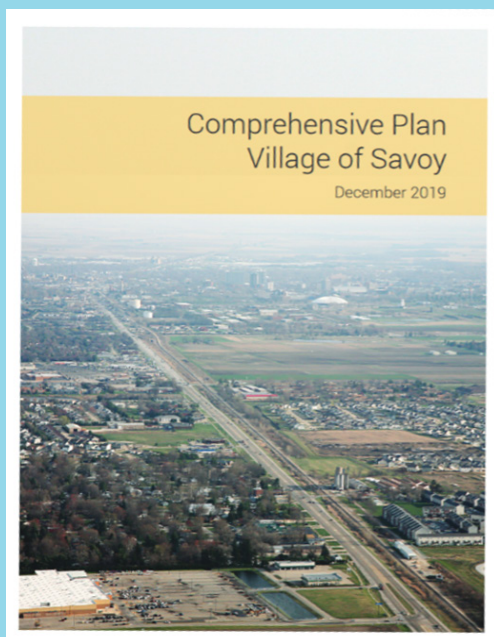
Village of Savoy

- The Village of Savoy has a [parks master plan](#) that includes pollinator gardens and will evaluate Savoy's assets and needs, including a chance for the public to provide opinions.
- The Village has an approved tree species list and is committed to replacing every tree that must be removed. The Village has a cost share program for tree planting in the right-of-way.
- Miniparks in Savoy have transitioned to pollinator habitat. Along the railroad, prairie patch remnants are no mow or low mow zones. These prairie patches have been designed and maintained in keeping with [David Monk's](#) vision for restoring railroad rights-of-way. More about Monk's life, leadership, influence and dedication to local and regional environmental work and prairie restoration can be found in the [Public i](#) and [News Gazette](#).
- The Savoy Village code includes green infrastructure guidelines and the Comprehensive Plan requires new development to include some open space.
- A new bike path on 1st Street to Savoy will include managed vegetation along the path.



University of Illinois

- The University of Illinois Campus Landscape Master Plan provides high level objectives for the campus approach to landscape, and aims to meet the University of Illinois [Illinois Climate Action Plan](#) objectives that include increasing biodiversity, increasing habitats for pollinators, and using more native plantings. There is broad student support for sustainability. Each year, students pay a Sustainable Campus Environment Fee. These funds are pooled into a \$1.5 million fund that is allocated annually by the [Student Sustainability Committee](#) (SSC) for environmental projects.





The University of Illinois, with Bee Campus USA designation, practices integrated pest management and reduces synthetic fertilizer and insecticide. Campus landscaping practices use leaves for compost. An approved plant list, with the goal of reintroducing perennials in plantings and agriculture, is in place to support more natives and plants that suit the environment. The design aesthetic deployed by campus landscaping suggests higher diversity plantings that are more pollinator and wildlife friendly. These practices require different maintenance and landscaping staff training considerations.



- Recognized as a Tree Campus USA in 2015, the University has a strong commitment to tree diversity, with 189 different tree species, 75 genera, and 38 families. When trees are replaced, they are replaced with a preference for native species. A comprehensive campus tree survey identified trees and locations, and campus is examining tree canopy cover. Per our analysis of 2020 LiDAR data, the campus canopy is 8.2%, which is an increase of 0.2% from 2008. The urban forest mix is 20/15/10, and the University is actively diversifying, managed by the Campus Landscape Architect. The University of Illinois uses [TreeKeeper software](#) to map trees on campus, providing each tree with a site ID and species identification.
- All oak species native to Illinois are present on the University of Illinois campus. Ten of the 14 native hickories are represented at the arboretum across from Meadowbrook Park on Race Street in Urbana.

- The Arboretum on Lincoln Avenue between Florida Avenue and Windsor Road is transitioning to a largely perennial landscape composed of mostly natives. The Arboretum is working with Pheasants Forever to create a savanna-style prairie strip along Lincoln Avenue. In the south Arboretum, efforts to remove honeysuckle are underway, and native trees and shrubs are selected to support bird species. Understory vegetation is being established.
- The Illini Experimental Forest in Urbana will help to preserve the natural diversity of Illinois forests by representing every species of oak and hickory growing in the state. This space functions as a living learning space.
- Pollinator pockets and prairie plants can be found at the following locations:
 - National Soybean Research Center
 - Orchard Downs
 - Allen Hall and Ikenberry Quad
 - The Red Oak Rain Garden (supported by SSC)
 - GIES College of Business
 - Dorner Drive Retention Pond (converted to prairie in 2022)
 - Solar farm 2.0 (54 acres of pollinator friendly plants) and Solar farm 1.0 (19 acres low mow)
 - [Vet Med prairies](#) (supported by SSC)
 - Several [green roofs](#) across campus (supported by SSC)
 - Three acre prairie at the Pollinarium, which has bee hives
 - The University of Illinois owns and manages a 2.7-acre prairie restoration site on Florida Avenue and Orchard Street in Urbana, restored by the University of Illinois.
- South Farms houses the Sustainable Student Farm, which is managed by students and contains native plant species and bee hives within a 50-foot radius of the native plants. The students grow annual vegetables and are experimenting with agroforestry.
- [The University of Illinois Institute for Sustainability, Energy, and Environment](#) (iSEE) funded an experimental woody perennial polyculture forest designed to provide tree nuts such as chestnuts and hazelnuts.

- Stretches of the Boneyard Creek on campus have been transformed into a living drainage system.



Beekeeping

Beekeeping: Champaign County allows beekeeping in all Zoning Districts because it's considered agriculture. There are no ordinances regulating beekeeping in Champaign County at this time. Illinois 4-H can provide education and resources about beekeeping.



Image source:

<https://4h.extension.illinois.edu/ways-participate/projects/beekeeping>

Urbana & Champaign Sanitary District (UCSD)

The Urbana & Champaign Sanitary District (UCSD) has supported biodiversity on and around both of their wastewater treatment plants.

At the northeast plant in Urbana, the UCSD has partnered with the Urbana Park District to create a 35-acre wetland and prairie restoration site converted from a “solid biowaste disposal site,” the Perkins Road

Restoration Project. Low areas have been reverted to wetlands and the high areas to prairie. The project was funded with grants and the UCSD has committed \$50,000 per year to maintenance. The site will be open to the public as a demonstration of what can be achieved on disturbed land.

At the southeast plant in Champaign, the UCSD has partnered with the Champaign Park District to develop Robert C. Porter Park to provide a buffer between the wastewater treatment plant and residential neighborhoods. Half of the park parcel is an active park, with a picnic gazebo and playground equipment, and half is prairie restoration.

The UCSD made stream improvements, including lowering creek bottoms, and exposing previously buried sewers. The stream bottoms have been armored with rocks, making a pool and riffle system, giving air and complexity to creeks, and creating microhabitats for fish and microbes.

Champaign County Forest Preserve District

The [Champaign County Forest Preserve District](#) (CCFPD) headquarters is approximately 10 miles northwest of Champaign. The Forest Preserve District stewards seven forest preserves covering over 4,000 acres in Champaign County. CCFPD’s “Natural Resources Program restores and maintains historically referenced, native biodiversity in Champaign County mainly by establishing native plant communities, which provide the habitat needed by pollinators and other wildlife” (2023 CCFPD Management and Budget Plan).

- iNaturalist projects have been established to categorize plants in all preserves. This citizen science project surveys plants either planted or introduced, and guides management at sites. Genetics, species, and habitat diversity are primary goals. All new projects are established to maximize genetic diversity, including planting with seeds found on other sites and native plant nurseries to increase genetic diversity.
- The CCFPD is collaborating with U.S. Fish & Wildlife Service for grants, and on [USDA Farm Service Agency Conservation Reserve Program](#) projects. In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality.
- Heron View Forest Preserve is a new CCFPD site (2021) made up of 103 acres of mixed floodplain and oak-hickory forest.

Opportunities and Gaps

While biodiversity is present and growing in the region, key informants identified opportunities for local government and institutions. Funding and staff time, of course, are challenges to changing current practices. However, the following opportunities could provide significant benefit to the overall biodiversity of the region. Three key opportunities are provided below.

Engaging diverse stakeholders on multiple levels will be important for improving biodiversity. Efforts to bring the region together through existing coordinating groups such as the [Champaign County Regional Planning Commission – Greenways and Trails Maps and Planning](#); [Champaign County Stormwater Partnership](#); [Champaign County Soil & Water Conservation District](#), and [ISEE’s Resilience iCAP Team](#) are first steps. Continuing to build education and awareness can be achieved through partnerships with non-governmental and volunteer organizations active in the area, such as the [East Central Illinois Master Naturalist](#) and [Champaign County Master Gardener Programs](#); [Champaign County Design and Conservation Foundation](#); [Prairie Rivers Network](#); and the [Prairie Group Chapter of the Sierra Club](#).

Participation from developers, business owners, and residents are needed to continue progress.

Research and outreach collaborations with the University of Illinois can be beneficial for identifying and conducting applied research, providing opportunities for learning with real-world examples, and a source of potential internships for students. These opportunities are highlighted in the green text at the conclusion of each section.



1. Promote Biodiversity and Quality Habitat for Species on Public Land

Public lands include lands owned and maintained by public entities such as cities, public schools and institutions of higher education, and park districts. Much of this space is made up of turf grass. This opportunity explores ideas for introducing native plantings to these public spaces and includes some considerations for addressing barriers and challenges.

- Many city and park district plantings are planted with annual or non-native species, but these could transition to perennial native cultivars, where and when possible. City-owned vacant lots and right-of-way land can be transitioned from turf grass to native species.
- In areas where native plantings may not be sustainable to maintain, no-mow strips may be a lower-maintenance alternative that provides habitat for a greater number of species than turf grass.
- While turf grass is important for recreational activities, land that is less desirable for recreation can be transitioned to native plantings. This may include land along roadways, in right of ways or medians, or land that is prone to flooding.
- Many birds and insects need continuous habitat to thrive. The current species in the region reflect the available habitat. Improvements will provide support for a broader range of species. Vegetative corridors can also provide hiking and biking options.
- Native vegetation corridors can be designed so that beneficial fauna can safely move through the region. Corridors might include continuous tree cover, increased diversity of tree species, and actively leaving snags in place when safe. (Snags are the name for dead trees that are left upright to decompose naturally. Dead trees provide vital habitat for more than 1,000 species of wildlife nationwide, according to the National Wildlife Foundation.)
- In streams and waterways that have not been naturalized, consider leaving dead logs, or adding rocks to encourage riffing, and creating pool systems.

“All living creatures change the world around them simply by going about the daily business of staying alive. To change the physical world is thus inevitable and appropriate ... Our challenge – our oldest task – [is] to use nature but not to abuse it.”

~Eric T. Freyfogle, Professor Emeritus, University of Illinois School of Law “Our Oldest Task”

- Most local public schools, including the University of Illinois and Parkland College, have large tracts of turf grass, some of which is not suitable for recreation but might be useful for prairie. Some smaller schools in the area may have paved areas and need play equipment upgrades. Both present opportunities for increasing biodiversity through design and upgrades. Planting prairie plants is a specialized activity and not easy for volunteers to maintain. Maintenance activities should be funded by the schools, using outside contracts if necessary. Volunteers can be best used for enhancement activities such as small pollinator patches or vegetable gardens, or plants, pollinator, or community food gardens. Consider engaging volunteer groups or training parents, teachers, and students to support and maintain the enhancement projects on school property when school is in session and out of session.
- Where and when possible, restore sizable prairie, wetland, or big grove forest habitat. This can serve recreational and tourism interests as these habitats attract migrating birds. This is an opportunity for park districts but could also be a best practice and opportunity to create vegetative landscapes around freeway interchanges.
 - Some areas where drainage is a concern can be turned into “puddles,” or areas where water temporarily pools after big storms. These spaces provide habitat. Where possible, maintain these areas and make them recreational amenities as well as storm water and biodiversity amenities.
- If feasible, set aside land for tree grove plantings, food forests, and constructed woodlands to help ensure that future generations have natural diversity.
- Include long-term maintenance plans in all designs. Consider providing training to grounds crews to ensure maintenance is consistent and appropriate. To maintain healthy levels of pollinator insects, consider banning all synthetic products on publicly maintained property.

University of Illinois Collaborations

University faculty and students can identify and share information with cities about the amount and type of habitat and cover to optimal support a variety of species. Consider partnering with entities such as We CU-Community Engaged Scholars and the Interdisciplinary Health Sciences Initiative.

Understanding and sharing the status of regional biodiversity is necessary to make improvements. A further in-depth analysis of species richness and composition would be valuable in assessing the region’s biodiversity. Baseline data is required to understand what is currently existing here and what can be improved. This includes the types of species present and the abundance of species.

Attention needs to be given to threatened and endangered species when gathering data for the region. Understanding the impacts of recreated habitat for plants and wildlife is important to guide future decisions on habitat expansion and urban landscape designs. This will help reveal the bigger picture of the region and make educated decisions for the future survival of native species. Cost-benefit and life cycle cost analysis is needed to help all public sector entities, which can include the University of Illinois and Parkland College, evaluate options and make optimal choices to increase habitat. This area presents an opportunity for applied research.

2. Support Biodiversity on New and Retrofit Development

The quality and quantity of habitat could be improved with changes in ordinances and guidance for developers.

- Although most soil health programs focus on farmers, ranchers, and large landowners, whenever topsoil is removed in new developments, soil health is greatly impacted. In fact, “soil erosion rates in areas disturbed by construction activity are 2 to 40,000 times greater than pre-construction conditions, and soil erosion is an important component of nonpoint source pollution that degrades surface water quality.” Cities can explore potential tax incentives and other policies that prioritize soil health in new developments. The Urban Land Institute is a resource on working with developers to build for biodiversity.
- Detention basins required for new construction can be problematic for a variety of reasons, not the least of which is that private ownership can lead to mismanagement and lost biodiversity and water quality opportunities. Consider alternatives to privately owned detention ponds, such as regional, publicly managed systems. At a minimum, consider adapting requirements (such as vegetated buffers around the perimeter) for new construction that provide more robust habitat.
- Provide incentives and education for developers to encourage adoption of best management practices, including increased biodiversity and stormwater retention in parking.
- Rethink parking lot design, requirements, and ordinances to provide more attractive and diverse spaces. Most cities require parking minimums; but new thinking in sustainable development suggests that jurisdictions should set parking maximums to encourage public transportation, walking, and biking. Reducing impervious surfaces for parking has benefits for stormwater systems as well as potential to reduce heat island effects. Reduced traffic congestion has positive effects on local air pollution. Linkages between reduced parking; use of green infrastructure; and biodiversity can be explored. Example [parking lot landscaping ordinance and design guidelines](#) have been published by the Chaddick Institute for Metropolitan Development at DePaul University.
- For native plantings, prairies, detention basins, etc., a long-term Maintenance and Management plan (M&M) should be required for any new development. This is essential to prevent developers from installing native plantings and green infrastructure to get approvals and permits, only to turn around and mow them down. [Orland Park](#) has a good example of this plan.
- Cemeteries and golf courses typically have large expanses of turf grass and few native plant species. Consider providing incentives for owners or property managers that encourage revisioning of these facilities.

University of Illinois Collaborations

University of Illinois can be instrumental in providing applied and accessible research and best management practices. Those efforts must be designed in collaboration with the cities or other stakeholders to ensure the recommendations provided are useful and implementable.

Consider setting up a region-wide Biodiversity Taskforce to monitor and promote progress. Collect and analyze existing new and retrofit development ordinances and code and share best practices and models with communities.

Consider biodiversity and equity models to demonstrate best practices for cities that ensure all residents have reasonable access to native plantings and biodiverse landscapes. Provide models, best practices, ordinances and incentives, and cost-benefit analysis for these types of retrofits.

University course projects have been used as a successful model for student-led and faculty-led assisted community projects in partnership with municipal and regional institutions.

Students can be encouraged to volunteer across the region on biodiversity-related projects.



3. Provide Resources for Homeowners and Private Businesses

Homeowners and private business are an important part of improving biodiversity and connecting habitats. While the cities and University of Illinois have little direct control over how private homeowners and businesses maintain their landscapes, following are some suggestions for activities that are under municipal or university purview.

- Programs to support native and pollinator friendly landscaping are increasingly popular. However, negative perceptions about native plants persist. Expand reach and support for these programs and education about benefits through partnerships with Extension, Parkland College, park districts and other community education and outreach avenues.
- Continue and expand residential rain garden and other stormwater management programs that support diverse species. Demonstration gardens and sharing rain garden plans are recommended to help adoption.
- Provide outreach and training on natural lawncare to companies. Consider supporting local businesses that embrace natural lawn care management. Continue and increase education and outreach to homeowners about lawn maintenance.

University of Illinois Collaborations

Share research and tools and techniques to promote behavior change and techniques to improve acceptance and adoption by residents. University of Illinois students can volunteer to create social media stories and campaigns. Extension/UIUC and municipalities can co-sponsor seminars on native plants and maintenance.

Short, Medium, and Long-term Actions

The following are action items that can support efforts to address the opportunities and gaps addressed above. The next step in this effort will include conversations among the cities and the university to identify specific and time-bound goals and approaches based on the recommendations in this report.

Short-term Actions

- Create a diverse, multi-stakeholder Biodiversity Taskforce.
 - One goal of the taskforce can be to share and track grant opportunities for native plantings – especially to provide incentives to private and commercial entities.
- Compile existing surveys and maps of biodiversity to identify places of abundant diversity, those lacking diversity, and data gaps.
- Support pro-biodiversity ordinances, commitments by UIUC and Parkland College, and plans for cities and park districts.
- The University of Illinois Facilities & Services Landscape Department, Illinois Extension, and Landscape Architecture/Urban Planning students research, test, and develop a list of appropriate low-mow grass species that can be shared with the community.
- Develop a photographic guide with real photos to show desirable landscapes achievable locally. List species and show realistic images that help consumers choose biodiverse landscapes.

Medium-term Actions

- Expand science-based, accessible public outreach and education.
- Update municipal ordinances to incrementally move toward long-term goals.
- Identify target areas for improved diversity.
- Install more demonstration gardens and biodiverse patches and corridors. Demonstration sites can include:
 - Both private and public land.
 - Vacant lots.
 - Parks.
 - Commercial property.
 - Rights-of-way.
 - Stormwater retrofits.
- Explore and identify funding for on-the-ground actions such as installation and maintenance across all habitat types from small native plant patches to larger habitats like wetlands.
- Map ideal locations for patches and corridors to support migrating species and include them in municipal master planning documents.

Long-term Actions

- Change public perception about native plants (attitudes and beliefs).
- Update and finalize ordinances to achieve long term goals.
- Expand natural areas and create migration corridors.
- Create large scale habitats such as large-scale wetlands; create connectivity between wetlands and other patches with wildlife corridors and recreational opportunities such as bike paths lined with native plants.
- Create a mosaic of prairie, wetland, and forest habitats.
- Continue to survey and conduct research to understand progress.

Strategies

The following strategies can enhance biodiversity throughout the region by using and building on the existing regional assets and strengths. This section is organized into themes that include regional collaboration, data collection and research, community programs and demonstration sites, biodiversity at home, partnerships with local nurseries/horticultural centers and landscape designers, and ideas and best practices for land retrofits.

Collaborate Regionally

Create a Biodiversity Working Group

Create a formal biodiversity working group to share information, seed campus research to address biodiversity challenges, and coordinate management strategies to maximize habitat. Document successes, failures, and lessons learned.

Potential partners: representatives from all municipalities in the region, Illinois Department of Transportation, Illinois Department of Natural Resources, Illinois Extension, University of Illinois researchers, private agriculture landowners, Urbana & Champaign Sanitary District, Champaign County Forest Preserve District, Urbana Park District, Champaign Park District, Red Oak Rain Garden, Champaign County Soil and Water Conservation District, city councils, school districts, residents, stormwater engineers, developers or homeowners associations, landscape architects, landscaping organizations, nurseries, property managers, golf course managers, and others.

Collect Data, Conduct Research, Track Results

Biodiversity Land Survey

Conduct a comprehensive regional biodiversity survey to understand community assets, understand where habitat could provide maximum benefit, and create a baseline to measure long term success. Incorporate and synthesize information from existing surveys completed by campus, municipalities, and community organizations. Engage students in this effort to benefit both the region and the students' educational goals.

Determining the **functional diversity** of the area is important for future projects. Understanding the functional role of plants and insects within the ecosystem can help determine a goal for plant diversity within the landscape to effectively account for ecological interactions, without over projecting an abundance of species that fulfill the same ecological role in the environment.

Sources of existing baseline data include:

- The [Illinois Natural Areas Inventory](#) - List of quality natural areas in the state of Illinois
- The [Illinois Natural History Survey collections search](#) - List of plant and animal specimen collections
- [iNaturalist](#) - Online public database with georeferenced species observations
- [eBird](#) - Birding database for avian observations

Map Habitat Patches

Maps of larger natural areas, pollinator pockets, green infrastructure, parks, and home landscapes across the region are helpful to determine suitable habitat corridor locations that could link the patches. Accomplish this type of analysis with GIS mapping tools, drive-by surveys, and manual data entry of specific places.

Local Climate Change Effects

Climate change is predicted to impact heat and drought periods, increase frequency and intensity of severe weather events, and alter the historic range of plant, animal, and insect species. These changing conditions will modify the current species composition present in the region. Planning for projected temperatures and precipitation regimes can determine species that will be resilient to the changing conditions. Trees, with their long lifespan, should be selected at the north end of their range to adapt to changing conditions over the next 50 years.

Engage Citizens to Collect Data

Engage citizens to participate in a bioblitz style survey [Bioblitz Guide](#) to provide baseline data. A bioblitz survey is a community focused survey designed to gather as much information about species composition as possible within a specific area and time frame. iNaturalist offers a framework for this style of survey. Within iNaturalist, the boundaries of the location can be set and anyone participating in the bioblitz can add entries using their phone. The app has a robust identification platform that allows novice participants to be involved in the efforts. Bioblitz surveys have been successful at Busey Woods and the South Arboretum Woods.

Pros:

Community-based surveys are cost effective ways to understand the biological composition of a region while also involving and educating the community about biodiversity. The data from the survey can be downloaded and analyzed. A survey of this magnitude would be sufficient at two- or three-year intervals to keep momentum and avoid exhaustion.

Cons:

It is difficult to record every species present. Certain species must be observed from a distance or under a magnifying glass and require professionals.

Community Programs: Education and Demonstration

Public outreach and education are important tools to engage and inform the region about the importance of biodiversity and what individual residents can do to increase biodiversity.

Existing Community Programs

Use local resources to provide community-based education and training about biodiversity. Local resource groups can help provide guidance and information about maintaining ecosystems that are new and unfamiliar.

Engage [Illinois Extension Master Gardener](#) and [Master Naturalist](#) volunteers to help design, install, and maintain biodiverse landscapes. More information about the Master Gardener and Master Naturalist programs is available in the links below.

Increase Visibility

Signs are important to communicate practices that may be unconventional or not fully accepted. Native plantings and demonstration gardens should have signs that indicate what is going on in this area and why it is helping. Reference a website or QR code where further information can be found.

Established sign programs in the region:

- Pollinator Pockets: [Pollinator Pockets | Illinois Extension | UIUC](#)
- Leave the Leaves: [Leave the Leaves! | Xerces Society](#)
- The Monarch Waystation: [Monarch Watch Monarch Waystation Program](#)
- Bee Campus USA: [Bee Campus USA Commitments - Bee City USA](#)

Demonstration gardens

Demonstration gardens showcase the successful benefits of native diversity and their potential to be aesthetically pleasing. They show native species plantings as a suitable alternative to annual and nonnative species. Large and small demonstration gardens that are well marked are beneficial to help gain public support.



Image source: [Red Oak Rain Garden Report April 2021.. The Red Oak Rain Garden Website](#)

The Red Oak Rain Garden is an excellent example of a demonstration garden maintained for aesthetic appeal, functionality, and as a teaching tool. This rain garden showcases native plants that are suitable for landscaping, look great, and provide ecosystem services to the community including flood mitigation and pollinator support.

The Master Gardeners Idea Garden is a project of the Champaign County Extension Master Gardeners



Image source: <http://arboretum.illinois.edu/gardens/IdeaGarden.php>

program. It highlights a wide range of plants, perennial fruits, and annual vegetables. The Idea Garden can be visited any time of year and is often used as an outdoor classroom for novice gardeners and as a teaching tool for U of I classes.

The Champaign Master Gardeners hold an annual fundraiser [Garden Walk](#) featuring exceptional gardens in residential neighborhoods in Urbana and Champaign.

Ecotourism

Ecotourism is defined as “responsible travel to natural areas that conserves the environment, sustains the wellbeing of local people and involves interpretation and education” (International Ecotourism Society, 2015).

Nature enthusiasts will travel across the state and country to visit high quality habitats and unique species. The region has multiple high-quality habitats, with remnant patches of bottomland forests and reconstructed quality habitats of prairie. University of Illinois has Tree Campus USA designation and legacy trees that would interest arborists and tree enthusiasts from around the state. Using these natural amenities as a basis for tourism can expand the knowledge of biodiversity and help promote biodiversity. Nature walks and tree tours are effective ways to engage with the public about biodiversity without being time consuming or expensive. Virtual story maps can be created to take the place of in person tours.

- Champaign is a Tree City that has over 150 different species of trees ([Champaign Tree City](#)).

- Urbana is a Tree City with over 262 different species ([Urbana's Tree City USA Designation | City of Urbana \(urbanaininois.us\)](#)).
- Carle Park Tree Walk: [Updated Hickman Tree Walk Brochure.pdf \(urbanaparks.org\)](#).
- University of Illinois Quad Tree Walk: [Tree Brochure Outside 4.21.19 \(illinois.edu\)](#).
- [Hessel Park Tree Walk](#)
- University of Illinois Urbana-Champaign maintains a Tree Campus USA designation through the Arbor Day Foundation. [Tree Campus Higher Education \(Ongoing\) | iCAP Portal | University of Illinois](#).

Increase Biodiversity in Residential Areas

Neighborhood landscaping:

Most established neighborhoods have a diverse collection of plants, many of which are not native to the Region. Many non-native plants are desirable for qualities such as aesthetics and fauna attractions, especially in landscaping or gardening projects, and can support local pollinator populations. High quality non-native species can be integrated into native plantings where they provide an important aesthetic or ecosystem function. Indigenous plants should take priority over non-native species because of their established relationship and benefits with the local environment.

Movement away from a hard-to-maintain grass lawn, free of weeds, with a few perennial bushes or shrubs in typical residential landscaping can lower maintenance costs, reduce chemical use, and increase biodiversity. Education and demonstration gardens will help encourage this migration. Free public resources are available to help homeowners design attractive gardens that incorporate native plantings. Illinois Extension has published materials to help homeowners [design a native garden](#). The Red Oak Rain Garden website has also published several [design guides](#) for home garden spaces that make the use of native Illinois plants.

Homeowners Associations (HOAs) can encourage residents to use native plants and biodiverse landscaping.



The City of Urbana [Stormwater Utility Fee Incentive Program](#) provides an incentive to owners for rain gardens, bioswales, vegetated swales, and green roofs.

Multi-family Opportunities

Cities can encourage and provide incentives to landlords and apartment leasing companies to include biodiverse landscaping and garden spaces for residents. This would expand biodiversity corridors, particularly in high rental areas near campus. Cities can provide lists of acceptable plants for new developments. If an apartment complex already has annual flower beds, planting perennial natives will reduce costs of replanting each year. A second opportunity is for students to lobby their apartment leasing agencies to allow gardens on the property. Agreements or lease terms can be revised to allow gardens at apartments if tenants maintain them. These rentals could have raised garden beds or pollinator patches as part of the incentive to rent with the company.

Landscape Maintenance

Maintaining native and biodiverse landscaping is different than maintaining traditional landscaping. Maintenance plans including trained staff and volunteers, are vital for success. There isn't a one-size-fits-all plan for proper maintenance, but all new and retrofit project should be designed with maintenance in mind.



Partner with Local Nurseries

Making natives readily available is an important step. Free seed programs, such as the seed exchange at the Urbana Free Library, encourage residents to learn about home gardening and diversify plantings. Plant sales such as the [Grand Prairie Friends sale](#), are also important.

Country Arbors Nursery in Urbana has a section of the nursery dedicated to native plants. Educate nursery owners or create partnerships with them to encourage them to stock more native plants. Couple this with education, planting guides, or guidance to homeowners at the point-of-sale to help home gardeners understand the benefits of and how to care for native species.

Native Plant Kit

Kits that include native plants, a garden plan, installation instructions, and a maintenance guide make native plantings easy for home gardeners. Kits could be sold at local plant sales, city events, or in partnership with local nurseries.

Retrofit Existing Spaces

Stormwater Retrofits

The Region has retrofitted stormwater infrastructure into multi-use, biodiverse amenities. For example, [Boneyard Creek](#) was highly channelized to move water away from the cities as fast as possible. Successful renovations along the stream reverted the Boneyard Creek back to naturalized conditions. For example, both the 2nd Street Basin and Scott Park now function as recreational outdoor spaces, while managing excessive stormwater naturally, restoring natural processes, and increasing biodiversity.

Vacant Lot Retrofits

City-owned vacant lots can become temporary, or permanent, greenified using low-cost techniques such as seeding the area and reducing mowing. Using warm-season grasses and native perennials, while avoiding any permanent plants such as trees, will help improve biodiversity until future development occurs at the site. Urban agriculture may also be an attractive use for these spaces. [Palmisano Park](#) in Chicago is a great example of a vacant lot transformed into a community greenspace. Chicago acquired the land in 2009 for development into a park space in the Bridgeport neighborhood. Previously, the land was used as a quarry (1800s-1900s) and later a dumping ground for construction waste.

Golf Courses

There are five large golf courses within the region, including ones owned and operated by the University of Illinois. Golf courses can function as urban oases for wildlife. These spaces usually have large trees with a good diversity of woody plants. Golf courses can transition non-playing surfaces to more natural landscapes using native grasses and perennials. Working with the golf associations is essential to promote native landscaping and may be advantageous for creating wildlife corridors. The U.S. Golf Association ([USGA](#)) provides examples of increasing habitat and native areas on golf courses.

Cemeteries

Cemeteries can function as open green space for wildlife in urban environments. Planting sections of cemeteries with prairie seed and following low-mow practices may be attractive and reduce maintenance costs. High quality remnant prairies exist at cemeteries just north of the region. See [Prospect Cemetery Prairie Nature Preserve](#) for more information.

Rights-of-Way

Rights-of-way, or the space between sidewalks and roads, are typically owned by the city and planted with grass and trees. Rights-of-way, road medians, interstate ramps, and buffer zones are excellent places to help improve diversity with native plantings and low-mow practices. Interstate ramps and major road corridors can beautify city entrances. The plants along roads can directly manage stormwater from adjacent impervious surfaces.

[Rights-of-Way as Habitat Working Group | Energy Resources Center | University of Illinois Chicago \(uic.edu\)](#)

Parking Lots

Native planting in parking lots can help beautify retail space and mitigate impervious surfaces in addition to increasing biodiversity.

[When 5% of the United States is Covered By Parking Lots, How Do We Redesign our Cities? | ArchDaily Depave Chicago](#)

[Green-Sustainable-Parking-Guide-2_10_2016-Web \(montcopa.org\)](#)

Low Mows

Low mows are areas of lawn left to grow with infrequent or no mowing through the growing season. These can be valuable for insects, plants, and wildlife. Native seeds will usually find their way into low mows and provide increased diversity for the area. A good example of this is the University of Illinois maintaining some low mow patches in the south farms area (next to the swine ponds). These are regularly mowed in the fall. However, in years that the university does not mow in this area, a high concentration of white crowned sparrows is present. In years when a final fall mow is performed, the sparrow population is substantially reduced.

Low mows require less maintenance than typical landscapes with reduced need to mow and fertilize. Unfortunately, non-native, and invasive species find their way into low mows. Low mows may have fewer aesthetic qualities and could be considered a nuisance, depending on who is asked. Nonetheless, with removal of invasives and acceptance of the looks, low mows can be a cost and labor effective way to improve biodiversity. Landscaping plans can specify a mowing schedule that precludes a final fall mow.

There are specific species that are good for low mow areas. Extension offices in cooler climates have posted lists of plant species that work in low mow areas. These can include cover crops, fine fescue grasses, ornamental and native grasses.

- [Low maintenance lawns in the Midwest - MSU Extension](#)
- [Lawn Alternatives \(psu.edu\)](#)
- [Planting and maintaining a fine fescue lawn | UMN Extension](#)
- [Lawn Alternatives | University of Maryland Extension \(umd.edu\)](#)
- [Low Mow Zones \(Ongoing\) | iCAP Portal | University of Illinois - The University of Illinois Facilities & Services Landscape Department, Illinois Extension, and Landscape Architecture/ Urban Planning students can research, test, and develop a list of appropriate low-mow grass species that can be shared with the community.](#)

Local Policies, Zoning Codes and Ordinances

Current codes do not require biodiversity to be incorporated into landscapes, but those requirements can be incorporated into ordinances through code updates. Consider uniform codes across the region to support improved biodiversity across municipal boundaries. Codes that state native landscaping is allowed with certain restrictions will deter nuisance complaints and promote public acceptance of native plants. Dedicate a specific zoning category toward conservation (as opposed to grouping it with recreation and education) to highlight land in reserve for conservation. By separating conservation from recreation and education-purpose lands, cities can allocate resources toward and dedicate land for conservation specifically. Update stormwater ordinances to have a minimum diversity of plant species in green stormwater infrastructure, depending on the size of the management practice. In the review phase for this report, the authors learned that Champaign is currently evaluating their landscaping code. Sharing information across regional partners can help make practices in one community accessible and regionally implementable.

Model Ordinances

Model ordinances can help identify opportunities that local jurisdictions may be interested in adopting that do not already appear in local code. The following list provides ideas for amending local ordinances regarding landscape and yard maintenance:

- Including height requirements, setback distances from sidewalks or roads, and a list of restricted species in the code will allow community members to see what is not allowed in terms of native landscaping.
- Local ordinances can allow taller plantings and more native plants around the region.
- Including specific plant species within the model ordinance (or further resources about the topic) can help educate and inform people about what plants to use and where to use them. The code would not list every native plant that people can use, but a list of tried-and-true species gives people ideas for native plants. The plant list should encompass habitat for different pollinators and wildlife. Plants on the list should be available locally.

Local governments may consider dedicating a percentage of public space to native landscaping to improve the biodiversity of the region and improve understory ecology. Converting around 5% of publicly owned turf grass to natives by a certain date is a reasonable goal mentioned during the survey process.

Streambank Restoration Ordinance

Create a streambank restoration ordinance to improve aquatic ecosystems and help manage stormwater. Expanding the width of a stream or creek, depending on how wide it is currently, will help revert streams to historical conditions and manage local stormwater. Natural edges accommodate multiple species of plants and animals. Expanding the width would work only where there is no infrastructure or private ownership. New development should require a larger setback from water bodies and areas that flood frequently. Setbacks from water bodies and flooded land would allow the region to expand on creek reversion projects and wetland restoration projects where development is restricted. The setbacks would also reduce future flooding issues.

Incentives

Municipal incentives encourage people to create and maintain native plantings, encourage local nurseries to carry more native species, and encourage people to shop locally. Incentivizing native plants and biodiversity in the code would encourage more people to participate in native gardening. Incentives for green infrastructure are already established in some of the cities in the region. This program could require a diversity of planted green infrastructure practices and provide greater incentives to those who include biodiversity within their green infrastructure. Incentives that do not require green infrastructure can be included. Green infrastructure can be expensive to install (even with the incentives), and those expenses may deter people from participating. Native plantings offer some overlapping benefits for the city as green infrastructure does, like increased stormwater infiltration. Cost share incentives for native plant purchases could be an incentive to encourage biodiversity. Enrolled participants could receive a rebate in the mail by submitting their receipt from a local nursery for native plants or seeds. These programs require public awareness to encourage the community to enroll.

Streetscape Plan

Rethinking the streetscapes invites new aesthetic possibilities into cities, creates new habitat corridors, can increase biodiversity, increase stormwater capture capacity, and create inviting walkable spaces for community members to enjoy.

Streetscapes

According to Tan et. al, “underutilized public spaces such as streetscapes offer substantial opportunities to integrate habitats that increase biodiversity into existing urban landscapes and create more ecologically connected cities.” Individual municipalities or collaborations across the region can work together to formulate and implement a streetscape plan that increases biodiversity in areas next to streets, sidewalks, trails, walls, and in medians. A streetscape plan may encourage a percentage of the public land adjacent to streets to be natives with an adjusted diversity of plant species.

Modular Suspended Pavement Systems to Support Tree Growth

As climate change is predicted to increase the frequency and severity of precipitation events, the built environment can benefit from green infrastructure projects, such as increased vegetation to help reduce harmful impacts of floods.

When planning major street retrofits, modular suspended pavement infrastructure that supports tree growth can increase available habitat for wildlife, promote tree health, and manage stormwater at the same time. Safe pedestrian sidewalks, bicycle lanes, and vehicle lanes can be designed. Design methods such as “silva cells” in street and sidewalk retrofits can improve the health of street trees and minimize compaction of soil around tree roots.

Municipal Managed Street Trees

The city arborists adhere to a ratio of family/genus/ ratio of public street trees. Establishing a lower ratio for the region in this plan can help cities increase the diversity of trees used in street plantings.



Registration for Native Patches

There are pros and cons for registration portals for native patches on private property in residential neighborhoods. Local interest and context should be assessed for the appropriateness of a registration-type program.

If municipal and local stakeholders want a registration system, an agency or municipality can create a registration form and on-line portal for residents to register pollinator patches and native plantings to help keep track of practices in the region, avoid nuisance claims, and reduce the use of banned or restricted plants. Plans with species, size, and location would be submitted to the city or partnering agency. Plant species that grow too high and plantings that violate setback distances can be declined. Updating the nuisance complaint form to include registered properties when filling out a claim will reduce the number of unsatisfied claims. Residents can display a sign outside their native garden to educate others about the practice and grow community interest.

Registration allows regulations for certain constraints without requiring someone to manually enforce each garden. Opting in through registration, residents could be permitted to use plants not allowed by other codes. For example, a taller compass plant taller than two feet could be planted, if the resident is beyond a setback distance and registers the garden. The registration program could serve as a model for other cities and towns. Potential drawbacks include resident confusion and taking resources and time to administer the program.

An alternative strategy is for cities to modify their code, so homeowners are subjected to fewer “aesthetic” codes such as grass height limits without compromising safety and accessibility, such as plants within sight triangles or within sidewalk buffers. Reducing restrictions on homeowners and residents may have the effect of allowing native plantings while reducing the burden on code enforcement. Non-resident landowners, such as corporations, lessors, and non-profit groups, may be better targets for aesthetic codes, as their landscaping is typically created and maintained by professionals.

New Development

Communities can think creatively about new developments. Program examples include municipalities developing a prescriptive path and/or a points-based adoption system (like a points-based checklist) for new development and construction practices that incentivize native plants and biodiversity. New developments can be required to account for shade trees in parking lots, include natural (or artificial) screening, and manage stormwater depending on the size of the project and zoning type. Points-based checklists can incentivize diversity by prioritizing multiple species over one. Reductions in turf grass coverage can also be incentivized or included in the prescriptive path. New developments can be required to follow the prescriptive path or achieve a certain number of points to meet minimum requirements. Points are achieved from different construction strategies. Incorporating multiple native species on the property could score higher than using one type of common or non-native species. Placing a cap on certain species in new developments can improve biodiversity. Caps and point values would be determined by city arborists and horticulturists depending on existing species diversity in the region. Municipalities have latitude to choose whether requiring native plants and biodiversity should apply to residential and/or commercial new developments.

While this section primarily addresses plant diversity, developers may also be encouraged to deploy [bird-friendly building design](#) practices for new construction.

Landscape Enforcement

Currently, no city staff are dedicated to enforcing plants that remain in the ground, be maintained, or satisfy code requirements in private spaces (a shade tree requirement for parking lots in the Zoning Code in Urbana is an exception). Hiring a compliance or enforcement officer or landscape horticulturist to oversee plantings will help ensure biodiversity is maintained and that plantings satisfy city requirements. A compliance officer would be able to help corporate entities and their landscapers navigate and comply with additional requirements in the code, like employment of stormwater compliance officers.

Cities can add requirements related to the removal of mature trees in private space in our Land Development Code.

Next Steps

This white paper gathered perspectives from around 40 community members across the region with different perspectives and areas of expertise. Opportunities, actions, and strategies were identified from these conversations. Increasing the biodiversity of the region can be accomplished by using the strategies to support three key opportunities: promote quality habitat on public land; provide education and guidance through ordinance and policy changes for new and retrofit development; and provide resources, both information and incentives, for homeowners and private businesses. Coordination among stakeholders with leadership from the municipalities and university through the formation of a biodiversity working group can accelerate progress and maximize ecosystem services and functional diversity. We encourage members of the iCAP Resilience Team to serve as early coordinators to help create and facilitate future biodiversity working group activities. Early goal setting can include:

1. Establish the Champaign-Urbana-Savoy metro region as a leader in biodiversity innovation and development.
2. Develop practices of coordination and collaboration among stakeholder institutions to incorporate biodiversity best management practices.
3. Support applied research to enhance local biodiversity.
4. Increase native plantings and restore habitats to support a diversity of wildlife on public and private property.
5. Explore and identify collaborations to tap University student, faculty, and staff talent to provide research, reports, and presentations in the community.

Appendix 1 – Admired Places

Key informants were asked which they admired for their biodiversity. Following are their responses.

State of Illinois

- [Charleston, IL food forest](#)
- Chicago
 - [Millennium Park](#)
 - [Morton Arboretum](#); good prairie restoration
 - The [Lurie Garden](#)
- [Grayslake Prairie Crossing](#), a conservation community
- [Kickapoo Rail Trail](#)
- [Lake County Buffer Strips](#)
- Mahomet Lake of the Woods
- [Lake of the Woods | Champaign County Forest Preserve | Mahomet \(ccfpd.org\)](#)
- Normal
 - The roundabout in downtown Normal
 - [About - Uptown Normal](#)
 - [Uptown Normal Circle and Streetscape | Landscape performance Series](#)
 - Green space that captures and collects stormwater and turns it into a fountain and helps water trees in the downtown area.
 - Colene Hoose Elementary School
 - Riparian restoration
 - Conservation buffer
 - Best practices
 - [\\$5 Million 'World Class' Playground Coming to Colene Hoose Elementary](#)
 - Food forest: Perennial polyculture
- Paxton
 - Two remnant prairies: Prospect cemetery prairie and Don Gardner's prairie
- Southern IL
 - Good diversity of bat populations

National

- Ann Arbor, Michigan
 - Park district
 - Habitat Creation
 - Retrofitting downtown w/ stormwater outdoor dining
 - Forward thinking when developing
 - Green belt program
 - Zone and acquire land outside of city to prevent urban sprawl
 - Huron river
- Austin Texas
 - Wastewater runs through series of ponds. Could not happen here because of winter
- Bloomington Indiana
 - Volunteers offered training on a Saturday to help manage streams (<?)
 - Miller Showers Park, Indiana
- Cleveland
 - Stream Policies
 - Bio habitats
- Detroit & Chicago
 - Urban Ag programs
 - Reduced density areas turned into community agriculture spots
 - Vacant lot management
 - [Detroit Biodiversity Network](#), SEAS Sustainability Clinic, [Huron-Clinton Metroparks](#)
- Detroit and Baltimore
 - Many vacant lots that have been transformed to be “green”
- Grand Rapids, MI
 - Retrofitted grey infrastructure with GI and street trees
 - Replaced pipes and installed GI

- Iowa
 - Has integrative roadside management
 - Planting roadsides with perennials
 - Reducing mowing
- Kentucky
 - Nursery working on productive native cultivars
- Las Vegas Nature preserve
 - Grey water used to recharge aquifer under nature preserve
- Madison, Wisconsin
 - Planning with infrastructure around campus with diversity and recreation
- Missouri botanical garden
- San Francisco
 - Uses wetlands and phytoremediation to process human waste
 - Places that don't have access to sanitary districts
- Milwaukee
 - [Milwaukee's Climate and Equity Plan](#) could lead to biodiversity benefits
- Minneapolis and St. Paul, Minnesota was noted for their
 - Arboretum
 - Designated spaces for species
 - Aesthetics
 - Water bodies
 - Natural parks
 - Goats eat grass to maintain land
 - Composting programs
 - Volunteer programs
 - Hiking trails
 - Helps foster interest in the outdoors
 - Top three bike cities in country
 - Dedicated bike trails have habitat for wildlife
 - Incentive to build rain gardens
- Philadelphia and DC in incorporating nature based solutions into planning process.
 - Rain gardens
 - Rain barrels
 - Compost
- Virginia has a student farm that works with the community
 - Started farmers market on campus grounds
 - Made investments on ways to scale up

Global

- Milan, Italy
 - Balconies have vegetation
 - Walls covered with plants
- Vienna Austria Low-income housing
 - Community housing
 - Vegetable gardens
 - Water is recycled and provides water for irrigation and people
- Costa Rica
 - Ethic and pride in diversity
 - Industry initiatives: Growing eucalyptus and trying to fix the problem of that species
 - Set aside large areas for habitat
 - Targeted restoration
 - Dealing with clear cuts
- Paris
 - Has micro parks and other places for people to go to interact with nature
- Germany
 - Laws about protecting wildlife
 - Disappointed that so much diversity is lost already
 - Inspired movement for diversity

Appendix 2 – Potential Funding Sources

[\\$7.6 Million in Grants to Support Imperiled Species | U.S. Fish & Wildlife Service \(fws.gov\)](#)

[5 Species Supported By The State Wildlife Grant Program | U.S. Fish & Wildlife Service \(fws.gov\)](#)

[Clean Water State Revolving Fund \(CWSRF\) | US EPA](#)

[Conservation Reserve Enhancement Program - Conservation Reserve Enhancement Program \(illinois.gov\)](#)

[Conservation Reserve Program \(usda.gov\)](#)

[Environmental Quality Incentives Program | Natural Resources Conservation Service \(usda.gov\)](#)

[Environmental Quality Incentives Program | NRCS \(usda.gov\)](#)

[Farmable Wetlands Program \(usda.gov\)](#)

[Five Star and Urban Waters Restoration Grant Program 2022 Request for Proposals | NFWF](#)

[Funding Opportunities and EPA Programs Related to the Food System | US EPA](#)

[Illinois Department of Natural Resources Grants](#)

[Open Space Lands Acquisition and Development Grant and the Land & Water Conservation Fund Grant](#)

[Grants - Illinois Native Plant Society \(illinoisplants.org\)](#)

[Grants | Pollinator.org](#)

[Green Infrastructure Grant Opportunities - Water Grant Programs \(illinois.gov\)](#)

[Habitat Funding - Grants \(illinois.gov\)](#)

[Hazard Mitigation Grant Program \(HMGP\) | FEMA.gov](#)

[PF_FactSheet_2022.aspx \(pheasantsforever.org\) / https://pheasantsforever.org/calloftheuplands](#)

[Illinois Acres for Wildlife - Wildlife](#)

[Illinois Natural Areas Stewardship Grant Program - Grants](#)

[Illinois Wildlife Action Plan](#)

[Monarch Butterfly and Pollinators Conservation Fund | NFWF](#)

[North American Wetlands Conservation Act | U.S. Fish & Wildlife Service \(fws.gov\)](#)

[Pollinator Meadows Program – Illinois Clean Energy Community Foundation](#)

[Recover Replant Restore – Trees Forever](#)

[Section 319 - Nonpoint Sources \(illinois.gov\)](#)

[Special Wildlife Funds Grant Program - Grants \(illinois.gov\)](#)

[Sustainable Agriculture \(illinois.gov\)](#)

[The Bee Grant – The Bee Cause](#)

[University of Illinois Extension Master Gardener Pollinator Projects](#)

[Urban and Community Forestry \(illinois.gov\)](#)

[Urban Bird Treaty Grant | U.S. Fish & Wildlife Service \(fws.gov\)](#)

[Wetland Reserve Enhancement Partnership \(WREP\) | NRCS \(usda.gov\)](#)

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Highlighting U.S. Efforts to Combat the Biodiversity Crisis. <https://www.state.gov/highlighting-u-s-efforts-to-combat-the-biodiversity-crisis/>

Resources include a Kansas State University capstone report [Ecosystem Service Delivery by Urban Prairie Patches](#)

Ohio State University guide [Managing Small Forest Patches for Birds: A guide for Ohio Landowners](#)

USDA - [The Cross-Pollinator: Connecting forested communities and delivering science for the trees outside your door](#)

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A resource on Silva Cells is available in the [NCDEQ Stormwater Design Manual](#). See section D-2. [Silva Cell Suspended Pavement with Bioretention by DeepRoot Green Infrastructure](#).

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