EASTERN TALLGRASS PRAIRIE & BIG RIVERS
LANDSCAPE CONSERVATION COOPERATIVES

FY16 BUSINESS PLAN

Focal Area: Urban Conservation

Ecological Places in Cities (EPiC)

Cultivating connectedness -- Providing people living in cities with resources to harmonize people, wildlife, natural and working landscapes in order to cultivate the love of life and living systems.

A strategy prepared by LCC Technical Advisory Groups to guide immediate conservation actions to restore and connect wildlife with people on the rich soils of a functional working landscape.

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Urban Conservation Technical Advisory Group (EPiC) - Core Team:

Kristin Shaw, Urban TAG Coordinator, Indiana University, US Fish & Wildlife Service
Craig Miller, Human Dimensions Network Coordinator, Illinois Natural History Survey
Will Allen, The Conservation Fund
Thomas Barnes, Chicago Audubon Society
Todd Degner, Urban Ecology and Design
Abigail Derby-Lewis, The Field Museum
Jill Erickson, Heartland Conservation Alliance
Damon Hall, St. Louis University
Erika Hasle, The Field Museum
Janette Marsh, EPA Region 5
Falyn Owen, Indiana DNR
Kara Salazar, Purdue University
Doug Stotz, The Field Museum
Roberta Vogel-Leutung, EPA Region 7
Shaena Ward, Empower Results
Nancy Williamson, Illinois DNR
Chris Wilson, City of Liberty, MO Parks & Recreation

Cultivating Connectedness – A natural and working landscape for both wildlife and people

Today more than 80% of Americans live in urban areas and by 2050 it is estimated that 70% of the world's population will call a city 'home'. Our cities are built on lands and river systems that connect to larger natural areas. The protection of that land and water is vital for a city's economy and the health and well-being of its urban residents. Ecological Places in Cities, EPiC, is a network of cities and conservation groups working together towards a new vision that integrates nature's benefits and natural defenses with the needs of our urban future. We use advanced urban planning approaches along with innovative civic leadership to ensure that urban nature and our future generations can grow and thrive together.

***Urban Conservation* – We can't afford to keep excluding urban areas**

Cities and nature have often been viewed as two separate things. Many strategic conservation planning efforts used to exclusively focus on finding the best places to protect nature from people. But as Dr. David Maddox, the founder of Nature in Cities accurately proclaims, "Cities are ecosystems of people, nature, and infrastructure." Thankfully that reality is now being acknowledged and an exciting and expanding movement is emerging to connect people to nature and to invest in green infrastructure that helps make cities sustainable, resilient, and livable.

One strategy to link people and nature is through protection of nature next to cities—creating defined edges or transition zones between developed areas and their surrounding natural areas and working landscapes. Another strategy to link people and nature is through integration of nature into cities—purposefully protecting and restoring green infrastructure inside urban areas, including the reuse of vacant and underutilized lands.[1]

With an ever more fragmented landscape and disconnected citizenry, conservation cannot afford to exclude urban areas and continue to consider them "white" spaces of inopportunity on the map. Urban areas are where the people are, as the introduction states, and where environmental conservation can occur in a synergistic way. One of the purposes of EPiC is to bring together nontraditional partners within urban areas to promote multipurpose projects that provide benefits to wildlife and people, both economically and culturally. Thinking in a more multidisciplinary way and approaching land use planning with an interdisciplinary approach can help reconnect the highly altered landscape we live in and cultivate the connection to nature people need.

EPiC began in 2014 with a multi-LCC urban conservation workshop conducted by the ETPBR and UMGL LCCs. The resulting working group is using Collective Impact principles to create an interconnected network of cities and landscapes where people live in harmony with nature.

Goal

Provide people living in cities with resources to harmonize people, wildlife, natural and working landscapes in order to cultivate the love of life and living systems.

Objectives

1. Reconnect people to nature by integrating green infrastructure into community revitalization
2. Establish ecologically-resilient urban communities within their larger landscapes by championing habitat conservation at multiple scales

[1] http://www.conservationfund.org/blog/1117-an-epic-journey-the-ecological-places-in-cities-network

3. Showcase how the social and economic benefits of healthy natural landscapes can promote green economies and foster community health and cohesion.

Within each objective, the EPiC Core team has proposed projects through the lens of the following strategies.

Immediate Strategies – Delivering training, engaging communities, & filling in the gaps

To accomplish the vision of EPiC there are four strategic approaches the EPiC Network has identified as means to approach projects. The four strategies are:

Urban Strategy 1: Scaling up & linking across landscape

Small actions when scaled up would provide significant benefit, green infrastructure core and connections, urban/rural linkage, across the landscape. It establishes what has the most impact on the landscape and where collective action takes place.

Urban Strategy 2: Best practices & technical transfer

Identify the best practices for each discipline (economic, cultural, and ecological) and establish ways to disseminate this information to practitioners to use in the application of their field.

Urban Strategy 3: Leadership, peer learning & networking

Create a shared peer-to-peer learning atmosphere and creating networking opportunities.

Urban Strategy 4: Pragmatic research agenda

Identify the pragmatic application of research to support management decisions.

These strategic approaches informed the projects proposed for funding based on the EPiC objectives.

Proposed FY16 Projects for Urban Conservation

Objective 1: Reconnect people to nature in order to revitalize communities

Many urban areas are experiencing high rates of vacancy and abandonment due to historically discriminatory housing policies and disinvestment in neighborhoods. Recent years some metropolitan areas have seen first and second ring suburbs trending similarly due to economic downturn. In addition, many cities have extensive brownfields—underutilized and potentially contaminated properties—in downtowns and areas where industry once thrived, with significant need for revitalization. Additionally, suburban communities are also continually in transition and under the potential threat of losing their ecological vibrancy and, like urban centers, are prone to decay owing to their underfunded infrastructure and isolated lifestyles that tear at vital social fabric.

Community revitalization efforts apply a suite of remedies with the goal of rebuilding the physical and social fabric of affected parts of cities and suburbs. These efforts lead to providing robust housing options, careers, cultural identity, and amenities that result in vibrant communities. Green infrastructure – connected natural systems and green spaces – integrated into community revitalization efforts offers an opportunity to give city dwellers, both human and wildlife alike, a way to move through nature that enhances the daily lives of these individuals. In turn, formerly neglected places become part of an interconnected and nature filled community, and the people who live in those places can connect, relate, and heal. What is more, communities with integrated green infrastructure become more water and heat climate resilient; provide cleaner air and water; provide places of respite, beauty, connection,

and recreation for people; offer mental and physical health benefits; are simply more desirable to be in; and, when properly maintained, create meaningful and sustainable careers opportunities.

***Proposed Projects*: Decision Support tool for incorporating ecological places in city planning**
This project will create a decision support tool usable by decision makers at the local, community, and regional scales to implement green and blue infrastructure to create ecological places within cities. By creating this tool, decision makers will understand the process for creating ecological places in cities, why it is important to insert nature into their gray infrastructure, and how the work being done at smaller scales can add up to have an impact at the larger scale. Examples of things that could be evaluated at each scale: at the local scale projects will be smaller, focused on restoration; community scale projects will focus on asset mapping; the regional scale will be focused on landscape conservation design. This project, as a whole, is broken down into the follow steps:

- **Data collection**
    - **Establish categories for decision support tool.** A list of basic concepts will be produced, which will serve as the framework for the entire project, by utilizing preliminary research on certification programs (done by the EPiC Core team), consulting with experts operating at each scale, additional literature review, etc.
    - **Inventory of current evidence based practices**. Work with expertise to identify where there are already evidence based practices and case studies (techniques and methods) in place for green infrastructure planning based on the three scales—site, community, & regional. These will serve as examples for each broader category and populate the web-based clearinghouse. See Appendix D for start of literature review started by EPiC Core Team Members.

- **Create Clearinghouse and online tool**
    - **Create web-based clearinghouse.** Creating a repository of evidence based practices, and case studies for integration of green infrastructure into community revitalization efforts will help practitioners develop their understanding of technical aspects, skills for community processes, and capacity for implementation. This clearing house will be organized based on the larger categories established during the data collection period creating a seamless transition to populate the decision support tool.
    - **Develop decision support tool.** Using the categories and practices established in the research phase, create an online user interface for decision makers to utilize as guidance for project planning. The tool will outline the process for implementing a project with an end result based on the categories established. Example. If your goal is to restore prairie at the local scale, this tool outlines how you could do that politically, culturally, ecologically and provides examples of evidence based projects that have overcome typical barriers facing local communities.
    - **Develop additional web-based technical support tools.** Web-based support tools, such as check-lists, return on investment calculators, scenario planning, and community revitalization educational webinars will support practitioners from relevant sectors in integrating green infrastructure into all phases of community revitalization.
    - **Hold Decision Support tool Forum.** This will be a workshop with experts from each scale informing the design of the decision support tool. All feedback will be incorporated into a second version of the decision support tool for wider use.
    - **Finalize Decision Support tool.** Incorporate any edits suggested during the Design Forum and create finalize tool package for dissemination to end users.

- **Pilot Decision support tool package at each scale.**
    - **Work with local nonprofits, municipalities, and states.** At each scale one pilot project will be selected to understand how to utilize this tool to inform where, how, and why to implement green and gray infrastructure within cities. Monitoring of both ecological and social aspects of the projects will take place for 2 years.

- **Provide trainings and technical assistance**
    - **Provide technical assistance for developing capacity.** Technical assistance for developing capacity for implementation of scalable demonstration projects for integrated green infrastructure in community revitalization projects. This process will help the use of green infrastructure for community revitalization gain successes. Assistance will be targeted to projects and places that will make the suite of case studies for all types and scales of projects more robust. Need to develop this in concert with TCF, NCTC, and other conservation planning leaders such as the sustainable cities design academy.
    - **Create model learning network workshop.** A model learning network workshop suitable for various scales of multi-sectorial community revitalization projects; will target specific project teams for assistance with the development and implementation of integrative green infrastructure / community revitalization projects. Participant teams consisting of multiple sectors will visit and learn about case studies, work with professional design and planning mentors to integrate green-infrastructure elements into the front end of their project process using best practice tools, develop action strategies and success measures to ensure implementation of the green infrastructure elements in their projects.

- **Evaluation of tool use and increasing the number of ecological places in cities**
    - **Establish metrics for evaluation and monitoring.** Based on categories selected for the decision matrix identifies measureable outcomes that could occur with the use of this tool. Understand how we can show success of the entire project.
    - **Evaluate tool using evaluation method of choice and establish mechanism for continued data collection (monitoring).** Evaluation can be done every 5 years after the first year evaluation period. Monitoring will need to be done continuously by participating entities.

Objective 2: Establish ecologically-resilient urban communities within their larger landscapes by championing habitat conservation at multiple scales

Protecting and restoring wildlife habitat in our cities and suburbs in the face of threats like climate change and development pressures is a vital component of wildlife conservation moving forward. Actions focusing on natural landscapes scaled down as far as backyards can accumulate in an urban landscape to support habitat connectivity preserving genetic variability and small populations from going extinct. Parks and natural areas within an urban area create a stepping stone mosaic for animals to use in order to navigate through the gray infrastructure inherent in city design. The green corridors provide opportunities for wildlife, beyond the typical backyard visitors, to utilize urban areas as a place to reside. In addition to creating places to live, green corridors provide resistance to climate change impacts by mitigating the impacts of urban heat island effect, flooding, and drought.

Proposed Projects: **Understanding urban species and their impact on larger populations**
This project is intended to shed light on which species thrive in urban areas, what their impact are on the larger population, and communicating the value of urban ecosystems for certain species. The larger project is broken down into the follow steps:

- **Data Collection**
  - **Summarize current literature on urban wildlife.** Information on species that thrive in urban ecosystems will be cataloged to: 1) create a comprehensive list of urban wildlife and fish species that will be used to inform the process of selecting target species for urban areas and 2) used to identify gaps in scientific research on the value of urban ecosystems for some species such as migratory birds, etc.
  - **Inventory of important urban wildlife species within the Midwest.** The process from the USFWS Region 3 surrogate species process[2], State Wildlife Action Plans, and work done by the Chicago Wilderness Priority Species Group[3] could be used to help inform the creation of a list of species that utilize urban areas. These lists will be created for multiple scales (local, community, regional).
  - **Identify research gaps for species within urban landscapes.** An example of this could be neotropical migrants that use urban landscapes as stopovers during migration because there aren't these spaces on the rest of the landscape. This would be the information to fuel the "why" urban conservation work matters.

- **Understanding why urban species matter?**
  - **Evaluation of urban habitat and impacts to larger wildlife population dynamics.** Research will be geared toward understanding the ecological value of urban species in the context of the landscape scale. Research will be geared towards list of target species for urban ecosystems and any research gaps identified in the previous stage. Additional research can be done to understand the value of species at the local and community scale.
  - **Profile and pilot campaigns in 4 cities.** Using the list compiled during the data collection period evaluations of these species will occur within four cities. These projects will focus on understanding current baselines species distribution and abundance and understanding habitat conditions within the city metropolitan area. Monitoring of species populations and on the ground habitat improvements will take place utilizing citizen scientists, interns, etc. This project needs to be well-integrated with ongoing efforts (e.g. CW Priority Species, State Wildlife Action Plans) and can model work being done on the Monarch LCD project.

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[2] Surrogate Species Information: http://www.fws.gov/mountain-prairie/science/documents/SSpecies%20Presentation%20Nov_5_2012.pdf; http://www.fws.gov/midwest/science/surrogatespecies/documents/UMGLSurrogatesSpeciesTechnicalReportFINAL2014.pdf; http://www.fws.gov/midwest/science/surrogatespecies/documents/MidwestStatusReport.pdf

[3] 12 Animal Species are identified as priority species for Chicago Wilderness (Blanding's Turtle, Blue-spotted Salamander, Bobolink, Ellipse, Henslow's Sparrow, Little Brown Bat, Monarch Butterfly, Mottled Sculpin, Red-headed Woodpecker, Regal Fritillary, Rusty Patched Bumble Bee, & Smooth Green Snake. http://www.chicagowilderness.org/news/271878/Chicago-Wilderness-to-Champion-12-Animal-Species-in-Region.htm More information about the Priority Species Project: http://www.chicagowilderness.org/?page=PrioritySpecies

- **Communicating the value of urban species**
  - **Develop messaging around urban areas value for wildlife and habitat and the value of habitat and wildlife for urban areas.** Based on the current and future landscape we have to be able to communicate the value urban landscapes will have in protecting our wildlife resources. We want to be able to paint the picture that liveliness can be within an urban area. This can be informed by the literature review at first and results from the pilot campaign program later on. For example - put out a list of the top 10 species that depends on cities or a report card on how ecologically important your city is.
  - **Create multi-faceted communication strategy with messages, targets, etc.** For example – management recommendations for large protected areas management vs. backyard habitats. Urban Tree Canopy is a good example of this. This will be informed by the decision support tool as well.

- **Monitoring Urban Species and Habitat Creation**
  - **Standardized Monitoring protocol.** Monitoring in urban landscapes can be quite difficult based on the diverse land use within the metropolitan boundaries. A protocol for sampling within this landscape will need to be created and provided for practitioners for guidance.
  - **Monitor impacts and feedback on engaging communities** – how do we best build awareness and best encompass the opportunities for people to engage and track progress towards urban conservation goals. The species could be monitored to evaluate success of ecological places in cities projects outlined within the decision support tool.

- **"Migratory Makeovers" demonstration projects for migratory species**
  - **Provide native plant guidelines by zip code** (coming with Audubon's Native Plant campaign)
  - **Develop and distribute "what you can do"** sheet – water, brush piles, native species, pesticide free, no reflective glass, shrub layer.
  - **Certify sites in four cities and promote as demonstration sites**
  - **Explore partnerships with Big Box stores** to promote the sale of native plants (e.g. Home Depot, Lowes)
  - **Develop game/competition around migratory birds**. Partner with Bird Studies Canada radio tracking. Focus a large communication campaign during spring and fall migration. Warbler counts, week-by-week checklists.

Objective 3: Showcase how the social and economic benefits of healthy natural landscapes can promote green economies while fostering community health and cohesion.

Urban areas are often perceived as being devoid of nature and healthy ecosystems, with cultural priorities inclined to nurture unsustainable economic activity and foster the development of fragmented communities. Urban areas are ripe with opportunities to create healthy natural landscapes, green economies, community health, and social cohesion.

By promoting connectivity among existing urban green spaces and designing new woodlands, wetlands, and prairies that are tailored to urban needs, space can be created for high quality habitats for native wildlife and dense human populations to coexist. Benefits include greater opportunities for outdoor recreation, which promotes both physical and mental health, improved air and water quality, as well as, economic and volunteer opportunities. This should be done in an equitable, just, and diverse way to benefit citizens across socioeconomic classes.

Development investments made by municipal governments should be tailored around protecting and enhancing nature in order to substantially decrease gray infrastructure costs and create green jobs. Ideally, these activities will engage cities and their residents with nature and hopefully inspire them to consciously and conscientiously participate in the larger environmental systems of which they are already a part.

Essentially:

- ✓ Enhancing nature is good for business.
- ✓ Nature can be an economic driver.
- ✓ There are economic benefits of green space and urban forests.
- ✓ The green infrastructure industry is a significant part of the economy, but it has not been considered its own industry category.
- ✓ Quality of Life metrics are useful for cities attracting businesses.

Proposed Projects: **The Value of Nature Communication Campaign**
This project is reevaluated after the completion of each portion of the project above. It focuses on communicating the value of the science and tools being created to decision makers and end users. Essentially it provides justification for why we do what we do in urban areas for green infrastructure decision and conservation work in general.

- **Communications Campaign**
  - **Brochures/Information for Decision Makers.** Create a suite of resources (e.g. digital tools, brochures, white papers, presentations) for decision makers to learn and communicate to their constituents the values and motivations behind decisions that promote green economies, green spaces, and healthy living. Think of this as providing the justification both from a technical perspective and an economic/social perspective for why people should care about these things.

- **Peer learning events – shared understanding of value and practices for sharing decisions on public lands among decision makers**
  - **Develop event curriculum**, well-integrated with decision matrix, urban value to species (see above). For example - restoring native plants and landscaping/landscapes on multiple scales. Show people in cities how to practice conservation on multiple scales.
  - **Host two peer learning events in person per year.** Explore innovate ways of sharing (e.g. social media, live-streaming). Target peer to peer events, such as City employees working with other city employees. Develop semi-formal relationship between cities to take ownership of events.

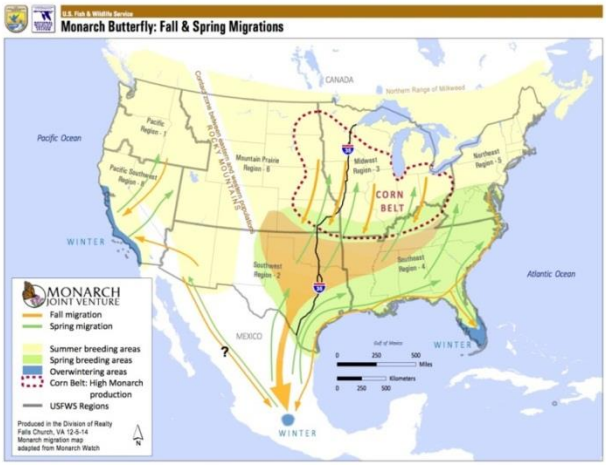
Monarch Butterfly Conservation – Landscape Design: A Monarch's View of the City

Monarch butterfly and other pollinators are in trouble. Monarch butterfly habitat— including milkweed host plants and nectar food sources—has declined drastically throughout most of the United States. Observed overwinter population levels have also exhibited a long-term downward trend, suggesting a strong relationship between habitat loss and monarch population declines.

Preliminary research results from a U.S. Geological Survey led effort indicate that we need a comprehensive conservation strategy that includes all land types in order to stabilize monarch populations at levels necessary to adequately minimize extinction risk—urban areas will likely play a critical role. This strategy reflects an integrated and interdisciplinary approach, one that includes

ecological and social dimensions specific to an urban landscape. In particular, it addresses the following questions:

- How do we strategically design urban landscapes to benefit monarch and other pollinators?
- What is the current and projected contribution that urban areas can make to monarch conservation both from an ecological and a social perspective?
- Where shall we focus habitat work, what are the most useful projects and efforts, and where can that work serve other existing urban priorities?
- How do we best engage urban sectors (e.g., transportation, health, utilities) of non-traditional conservation participants?
- Can urban areas and the utility and transportation corridors that support them along the monarch migration corridor work as a network of stopover refugia for adult monarchs during the spring and fall migration?



The current project has four steps:

1) Develop a Landscape Conservation Design (LCD) for the Chicago metropolitan area, and make available the factors, principles and design considerations to guide development of additional efforts;
2) Develop additional city-based LCDs for Minneapolis-St. Paul, Kansas City, and Austin;
3) implement and evaluate demonstration projects referencing the prototype LCDs; and
4) Hold a workshop with a mid-continent migratory pathway focus to integrate individual LCDs into a cross-regional approach.

In the end, we aim to describe the desired types, amounts, and distribution of monarch/pollinator habitat in an urban setting. All work will incorporate geographic, biological, and social science data using land use categories with objectives, metrics, stakeholders and best management practices to match each level.

Status – The Chicago Field Museum is well on their way to completing this project. Currently, Steps 1 &2 are underway, as Field Museum personnel have initiated social and ecological spatial analysis, using the Chicago metropolitan region as the first LCD focus. We have also selected additional cities that will work alongside the Chicago effort, learning and adapting in each city to inform the final LCD framework. Criteria for city selection included location, size, demographics and partnering to ensure the LCD design can be applied to a range of urban conditions. Based on these criteria, Minneapolis-St. Paul (MN), Kansas City (KS-MO), and Austin (TX) were chosen as additional pilot LCD cities.

Proof of concept projects focused on biological and social aspects of the project will be implemented summer 2016. The projects can be varied, and can include a) sampling of recently planted monarch habitat at different land use types and/or different scales to help populate the model with realistic data, or b) conducting surveys, interview or focus groups with a range of stakeholders involved in habitat management to help inform best practices for engagement strategies and identifying community co-benefits to planting diverse Monarch habitat. The ETPBR LCC's Ecological Places in Cities (EPiC) network of urban conservation practitioners in collaboration with the Chicago Field Museum and City partners

will then hold a workshop to introduce and adapt the initial LCD test cases to a broader network of urban areas.

Monarch Projects: **Next Steps for Urban Monarch LCD**

- **User interface for LCD tools**
    - **Post workshop users.** The Field Museum will incorporate as much feedback from the workshop into the model prior to the contract end date of December 2016. However, modification of the final tools may take more time than provided dependent upon the feedback provided. Additional funds could be required to finalize tools that can be usable by any city to create a Monarch LCD for their city.
- **Research on City Impacts at larger scales**
    - **Scaling up the LCD to Monarch Migration Route.** Further LCDs will need to be completed to understand the largest scale of scope, the migratory pathway, and the impacts urban areas can have on the Monarch population cumulatively. An understanding of the impacts cities located in the breeding areas could be ready by December 2016, however impacts on all four generations may not be fully understood.
- **Training on use of LCD templates and best practices tools**
    - **Online training MOOC (Massive Open Online Course) for training.** Requires contractor to create an online course. Participants will be trained to create an Urban Monarch LCD for their city. At the end of the course participants should create the LCD with partners. This creates a community of practice and an opportunity to track the use of the LCD in future cities.
    - **Trainings offered through existing train the trainer networks - NCTC, APA, EPA, TCF, etc. for cities.** Work with institutional staff to create a curriculum for training.
    - **In person train the trainer workshops for cities.** Curriculum for training will need to be created, and trainers hired for trainings along the monarch migratory path.
- **Demonstration projects/pilot projects within "hot spot" areas**
    - **Promoting on the ground conservation.** This would be funds to test the engagement strategies outlined within the framework. It would test both social aspects and the biological impacts of the work being informed by the final LCD map for a city.

Estimated Budget for Proposed EPiC Projects

Project title	Estimated Cost
1) Decision Support Tool	**$375-$850K**
a) *Data Collection*	$30-50K
b) *Create Clearinghouse and Online Tool*	$165-260K
c) *Pilot Decision Support tool package at each scale*	$60-$300K
d) *Provide training and technical assistance*	$70-$170K
e) *Evaluation of tool use and number of ecological places in cities*	$50-70K
2) Urban Species Research	**$450-660K**
a) Data Collection	$30-50K
b) Understand why urban species matter	$350-$500K
c) Communicate value of species	$40-60K
d) Monitoring Urban species and habitat creation	$30-50K
3) Communication Campaign	**$120-170K**
a) Brochures/Information for Decision Makers	$20-40K
b) Peer Learning Events	$100-130K
4) Urban Monarch LCD Project	**$600-830K**
a) User Interface for tools	$130-200K
b) Research on City Conservation Efforts – Large Scale	$250-300K
c) Trainings on the use of LCD tools	$70-$130K
d) On the ground Projects	$150-200K
TOTAL ESTIMATED BUDGET	**$2,510,000**

ETPBR LCC Prairie Restoration Outcomes & Performance Metrics

Performance metrics reflect the outcome-based approach that LCCs are taking to produce landscapes capable of sustaining natural and cultural resources. Examples of possible landscape-scale performance metrics for the ETPBR LCC are based on the current objectives for each Focal Area, informed by the US FWS Region 3 Surrogate Species created for the ETPBR LCC and associated research (**Error! Reference source not found.**). These metrics will continue to be refined with input from Technical Advisory Groups.

Potential opportunities for collaboration with existing or emerging monitoring networks include:

- Urban Conservation – not known

Table 1: Examples of urban conservation resources with measurable objectives and performance metrics.

Focal Area	Measurable Objectives	Performance Metrics
Reconnect People to Nature in the City	Reconnect people to nature by integrating green infrastructure into community revitalization	TBD
Resilient Urban Communities	Establish ecologically-resilient urban communities within their larger landscapes by championing habitat conservation at multiple scales	TBD
Urban Ecosystem Services	Showcase how the social and economic benefits of healthy natural landscapes can promote green economies and foster community health and cohesion.	TBD
Monarch Butterfly Conservation	Promote the values and management of prairie ecosystems among communities and landowners.	TBD

Literature Review: Reconnecting people to nature in order to revitalize communities

*Prepared by Will Allen, Damon Hall, Falyn Owens

Defining a green infrastructure economy

- NatureWorks case example linking green infrastructure jobs to US Department of Labor industry codes (http://www.jff.org/initiatives/natureworks)
- Phytoremediation examples
  - South Suburban Mayors Management Association in South Cook and Will CountiesIL is adding green infrastructure into their site remediation and redevelopment investments. They are working with local land banks to own and manage these sites (http://www.millenniumreserve.org/Priorities/being-green-in-blue-island/, http://ssmma.org/program-areas/environment/).
- Dendroremediation examples
  - Dendroremediation is the use of trees to remove contaminants from soil, groundwater, and sediment. Greening of Detroit is planting hydrid poplar and willow trees of brownfield sites to measure their ability to remediate heavy metals and other nasty substances and to assess their survivability within contaminated soils. Research is under way to measure cost effectiveness and replicability (http://www.greeningofdetroit.com/what-we-do/city-planning/, http://detroitfuturecity.com/wp-content/uploads/2014/12/Dendroremediation.pdf)
  - Mycology, the study of fungal biology, is an underappreciated science when it comes to the importance of mushrooms and fungi in potential remediation applications. They can be a key part of brownfield clean up strategies

(http://www.perc.org/articles/mushrooms-meet-brownfielda, http://www.opb.org/news/article/mushrooms-help-clean-up-pollution-on-former-landfill-site/, http://www.theremediators.com/)

Saving room for nature as urban areas expand

- Low impact development and environmentally sensitive site design
  - Identifying and preserving key greenspaces, such as natural wetlands or critical wildlife habitat, during development planning (Rural by Design: Planning for Town and Country, second edition, by Randall Arendt, Published by the American Planners Association)
  - Employing development practices which preserve ecosystem services that are provided by natural spaces, such as water bioretention and filtration, air filtration, crop and garden pollination, mosquito control, etc (http://www.epa.gov/green-infrastructure).
- Landscape-scale green infrastructure planning
  - Chicago Wilderness (http://www.chicagowilderness.org/)
  - Indiana Healthy Rivers Initiative includes the Wabash River watershed and encompasses the city of Terre Haute (http://www.in.gov/dnr/6498.htm)
  - Corridor ecology, greenways design, or wildlife corridors: green pathways that connect one patch of habitat to another allowing species to move across wider areas despite human development (the Jaguar Freeway)

Regional economic benefits of bird watching and other nature-based tourism

- "Where birds thrive, people prosper" from Audubon.

Investing in urban green infrastructure for multiple community benefits

- Stormwater related examples
  - Blue Island, IL found that it was better to fund this company to do green infrastructure maintenance than try to have their Public Works department try to do it. Working with High Bridge also made it easier to implement the community's priority projects, which usually involved multi-benefit stormwater projects (similar to Amigos de los Rios) (http://www.blueisland.org/bluewater/)
  - Pembroke Woods, Frederick County, MD is an innovative subdivision design based on low-impact development practices. Though there were considerable challenges to overcome permitting restrictions and concerns about effectiveness, the project was highly successful. Low-impact design resulted in an estimated $420,000 in cost-savings, while hydraulic analysis showed that the development will provide suitable peak discharge control for 100-year storms. The project was also highly received by the public.
- Urban agriculture examples
  - Utica NY community garden initiatives spearheaded by NY state health department, with many local partners (http://forthegoodinc.org/utica-community-gardens/). Bottom-up planning approach surveying community needs (25% of Utica's current population is resettled refuges from over 60 countries!) while state provided technical expertise on soil screening, raised bed design, social enterprise resources to build planters, horticulture training (through Cornell), Master Gardener support, volunteer hours through school programs, etc.

Property Values are enhanced by natural amenities/vegetation

- Noelwah Netusil- Netusil, N.R., Z. Levin ('11), V. Shandas, and T. Hart. 2014.Valuing Green Infrastructure in Portland Oregon. *Landscape and Urban Planning* 124: 14-21.
- Netusil, N. R. 2013. Urban Environmental Amenities and Property Values: Does Ownership Matter? *Land Use Policy*31: 371-377.
- Kadish, J. and N. R. Netusil. 2012. Valuing Vegetation in an Urban Watershed. *Landscape and Urban Planning* 104 (1) 59-65.

Insurance Value of Urban Ecosystems and their Services

- The Nature of Cities Posting: http://www.thenatureofcities.com/2015/09/29/what-is-the-insurance-value-of-urban-ecosystems-and-their-services/
- Foster, J., Lowe, A., & Winkelman, S. (2011). The value of green infrastructure for urban climate adaptation. *Center for Clean Air Policy, February*.
- Green, T., Kronenberg, J., Andersson, E., et al. 2016. Insurance value of green infrastructure in and around cities. Ecosystems, accepted.

Value of Trees for Cooling Costs

- One study estimated air conditioning costs can be reduced by approximately 2% per residential tree (Simpson and McPherson 1998), although tree species vary in their effects on human thermal comfort (Georgi and Dimitriou 2010).
- Simpson JR, McPherson EG (1998) Simulation of tree shade impacts on residential energy use for space conditioning in Sacramento. Atmos Environ 32(1):69–74
- Georgi JN, Dimitriou D (2010) The contribution of urban green spaces to the improvement of environment in cities: case study of Chania, Greece. Build Environ 45(6):1401–1414

Transitional planning for reuse of polluted land

- Little Village EJO Chicago (http://lvejo.org/)
- Case study of Milwaukee's 30th Street Industrial Corridor urban agriculture project. Demonstrated that these projects can take a long time and go through a lot of iterations before they come up with an optimal solution (http://www.mmsd.com/-/media/MMSD/Documents/Flood%20Management/GWC_Report_FINAL040615.pdf) Clean up was very expensive, so they capped the contaminated soil (so they would not have to truck it to a landfill) and created raised beds, added hoop houses (Growing Power assisted), and added some stormwater runoff design elements, including a Aquablox cistern/bioswale (from Reflo), which was cheaper than traditional concrete. MMSD funded the stormwater work to comply with CSO. Cream City Farms LLC currently leases the property (http://www.wpr.org/urban-farm-taking-root-former-industrial-site-milwaukee).

Establishment of 'green collar' workforce training

- High Bridge, a social enterprise company overseen by OAI (http://www.oaiinc.org/), is implementing green infrastructure flood prevention projects in the Calumet area (http://www.millenniumreserve.org/Priorities/high-bridge/).
- Green collar job training examples (http://ellabakercenter.org/resources-for-job-seekers)
- Workforce training courses (Montgomery Co MD): http://cms.montgomerycollege.edu/wdce/bits/greenenergy.html
- Keep Indianapolis Beautiful, Inc. provides green-collar professional training opportunities for high school and college students. (http://www.kibi.org/)
- Model example from green jobs program for youth City of St. Louis (need link)

Decision support tools to estimate the value of healthy natural landscapes

- Ecosystem service valuation tools (Chicago Wilderness and others) (https://datahub.cmap.illinois.gov/group/green-infrastructure-vision)
- Environmental Justice Greening Tool (http://www.epa.gov/ejscreen)
- Delta Institute has released a green infrastructure toolkit for property owners and municipalities (http://delta-institute.org/2015/09/delta-releases-green-infrastructure-toolkit-for-property-owners-and-municipalities/). Featuring a decision support tool and downloadable design templates for bioswales, rain gardens, stormwater planters, permeable pavement, and underground storage, the publication offers practical tools that can be scaled to sites across a wide geography.
- Ecosystems Services- InVEST Natural Capital Project- A tool with 18 different models for mapping and valuing ecosystem services provided by land- and seascapes. By Stanford University, University of Minnesota's Institute on the Environment, The Nature Conservancy, World Wildlife Fund (http://www.naturalcapitalproject.org/invest/)

Volunteer opportunities for urban nature enhancement

- Milkweeds for Monarchs (https://www.stlouis-mo.gov/government/departments/mayor/initiatives/sustainability/monarchs/index.cfm)
- Faith in Place—faith based organizations provide an avenue for volunteer opportunities in their communities
- Backyard bird counts, Citizen Science (Project FeederWatch, eBird, Indiana DNR citizen science trail camera project)
- Neighborhood pollinator projects (e.g. Pollinator Live Citizen Science, Master Gardeners)
- The Wildlife Federation Backyard Habitat Certification Program
- Indiana DNR Urban Wildlife Program – technical and financial assistance for installing urban wildlife habitat on municipal, business, and neighborhood properties.