



Where Nature & People Thrive



KANSAS CITY, MISSOURI
Parks and Recreation
Sustainability Plan

INTRODUCTION

On April 30, 2018, the City of Kansas City, Missouri's auditor released a report assessing the Parks Department's environmental sustainability of its natural resource management. While the auditor recognized that the Department has some sustainable practices in place, including rain gardens and protected natural remnants, the office recommended several areas of improvement.

In July, the Kansas City, Missouri Parks Department contracted with the Kansas City Native Plant Initiative (KCNPI) to provide recommendations to improve Parks' environmental sustainability and natural resources management.

Specifically, KCNPI

1. benchmarked three cities which have successfully incorporated sustainability by increasing native plantings, decreasing mowed turf, adopting integrated pest management (IPM) and reducing planting of annual plants, use of water, and greenhouse gas emissions.
2. identified and utilized resources from the National Recreation and Park Association (NRPA) including design standards and best practices for native areas.
3. reviewed case studies to identify best sustainability practices from NRPA.
4. identified green infrastructure opportunities via NRPA.
5. created a revenue neutral plan to transition 20 percent of the Parks Department's annual beds to native perennials.
6. developed a plan to reduce turf grass by five percent, excluding sports fields and golf courses, over the next five years to reduce mowing and meet other sustainability goals.
7. created recommendations to reduce water use by 10 percent in three years excluding golf courses and sports fields.
8. produced a plan to reduce chemical use through an Integrated Pest Management Strategy and improving soil health.
9. identified the data points and possible mechanism to track the return on investment of recommendations over the next three years.
10. is recommending potential funding sources for the expanded sustainability program.

KCNPI is a collective impact organization of nearly 70 partners. Working collaboratively, these partners seek opportunities to regenerate our local ecosystems with native plants. KCNPI relied on its network of partners to provide expertise, guidance, and relevant experience to our recommendations.

Through work groups and benchmarking, KCNPI identified three fundamental recommendations. This endeavor requires significant resources in staffing and equipment. The ongoing success of these sustainability recommendations depend on regular staff trainings. And a strategic communications plan will encourage community support for native landscapes and a new landscaping aesthetic.

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1. RECOMMENDATION — ANNUALS TO NATIVE PERENNIALS

The Kansas City Native Plant Initiative convened a work group of 10 horticulturists and native plant experts. KCNPI tasked the work group to provide recommendations for replacing 20 percent of the Parks Department's annual beds with native perennials in a two-year period. The work group focused on plants they determined to be the most environmentally sustainable, i.e. they provide pollinator habitat, use less water, and contribute to healthier ecosystems. The work group chose species that are aesthetically pleasing and do not have complicated maintenance requirements.

Of the Parks Department's 108 beds, at least 80 of these are planted each year with more than 18,000 annual forbs.

Native perennials:

- have an increased probability of success,
- decrease labor needs, allowing staff to be assigned to other priorities,
- preserve and increase genetic diversity of plant life,
- promote healthy habitats for wildlife and people,
- reduce maintenance costs through decreased reliance on fertilizers, herbicides, pesticides,
- require less water after establishment, improve water quality, and
- become a working part of a climate resilience plan because they sequester more carbon than their annual alternatives¹.

Transitioning annual beds to native perennials has many financial benefits as well. After the establishment period of two to three years, regular watering is less necessary. This will not only reduce water use, but also staff time, equipment and mileage devoted to this task. Finally, replacing even 20 percent of the annual beds with perennial natives can save nearly \$9,000 in plant purchases each year after installing perennials.

KCNPI's work group identified a short list of "most likely to succeed" native plants. The KCNPI work group identified a list it considered the *most sustainable and regenerative plants*; therefore, native cultivars or non-native perennials were not considered. The native plant work group based its recommendations on the likelihood that the existing annual beds are in full sun and receive regular watering. The group suggests that the Parks Department replace entire annual beds with native perennials rather than a mix of annuals and perennials. The recommended species provide texture, varied bloom seasons, have high success rates and behave predictably. Due to the growing demand for native plants, **KCNPI strongly recommends the Parks Department contact growers as soon as possible to place orders for the next growing season.**

¹ North Carolina State University. "Scientists Find That Grasslands Can Act As "Carbon Sinks". ScienceDaily, 15 January 2001.

1. RECOMMENDATION —

ANNUALS TO NATIVE PERENNIALS (CONT'D)

The following details and photos are provided by the Missouri Botanical Gardens.

1. **Prairie Dropseed**, *Sporobolus heterolepis*, selected by the KCNPI work group for its texture



Height: 2.00 to 3.00 feet

Spread: 2.00 to 3.00 feet

Bloom Time: August to October

Bloom Description: Pink and brown-tinted

Sun: Full sun

Water: Dry to medium

Maintenance: Low

Suggested Use: Ground Cover, Naturalize, Rain Garden

Flower: Showy, Fragrant

Leaf: Good Fall Color

Attracts: Birds

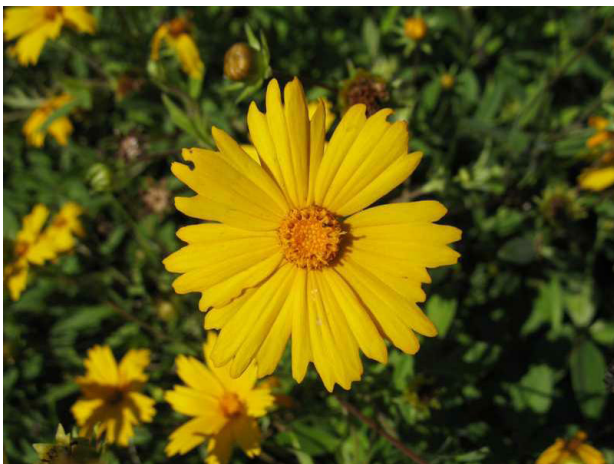
Tolerates: Deer, Drought, Erosion, Dry Soil, Shallow-Rocky Soil, Black Walnut, Air Pollution

Attracts: Birds

Other: Winter Interest

Also note that the Prairie Dropseed is a Missouri Botanical Garden Plant of Merit. Plants of Merit are easy to grow and maintain, are not known to be invasive in our area, are resistant or tolerant to diseases and insects, have outstanding ornamental value and are reasonably available to purchase.

2. **Star Tickseed**, *Coreopsis pubescens*, selected by the KCNPI work group for its spring bloom



Height: 1.00 to 2.00 feet

Spread: 1.00 to 1.50 feet

Bloom Time: May to July

Bloom Description: Yellow

Sun: Full sun

Water: Dry to medium

Maintenance: Medium

Suggested Use: Naturalize

Flower: Showy, Good Cut

Attracts: Butterflies

Tolerates: Deer, Drought, Dry Soil, Shallow-Rocky Soil

Also note that the Prairie Tickseed is a Missouri Botanical Garden “Tried and Trouble Free (T&T)” plant selection. T&T plants are selected by plant experts because they perform well without problems year after year.

1. RECOMMENDATION —

ANNUALS TO NATIVE PERENNIALS (CONT'D)

3. Butterfly Milkweed, *Asclepias tuberosa*, selected by the KCNPI work group for its orange, summer bloom



Height: 1.00 to 2.00 feet
Spread: 1.00 to 1.50 feet
Bloom Time: May to July
Bloom Description: Yellow
Sun: Full sun
Water: Dry to medium
Maintenance: Medium
Suggested Use: Naturalize
Flower: Showy, Good Cut
Attracts: Butterflies
Tolerates: Deer, Drought, Dry Soil, Shallow-Rocky Soil

The Missouri Botanical Gardens also designates the Butterfly Milkweed as “Tried and Troublefree.”

4. Aromatic Aster, *Symphyotrichum oblongifolium*, selected by the KCNPI work group for its fall, lavender bloom



Height: 1.00 to 3.00 feet
Spread: 1.00 to 3.00 feet
Bloom Time: August to September
Bloom Description: Blue, purple
Sun: Full sun
Water: Dry to medium
Maintenance: Medium
Suggested Use: Ground Cover
Flower: Showy
Leaf: Fragrant
Attracts: Birds, Butterflies
Tolerates: Drought, Erosion, Clay Soil, Dry Soil, Shallow-Rocky Soil

The Missouri Botanical Garden designates the Aromatic Aster as “Tried and Troublefree.”

1. RECOMMENDATION —

ANNUALS TO NATIVE PERENNIALS (CONT'D)

5. Pale Purple coneflower, *Echinacea pallida*, recommended by the KCNPI work group for its summer, purple flower



Height: 2.00 to 3.00 feet
Spread: 1.00 to 1.50 feet
Bloom Time: June to July
Bloom Description: Pale purple
Sun: Full sun to part shade
Water: Dry to medium
Maintenance: Low
Suggested Use: Naturalize
Flower: Showy, Fragrant, Good Cut
Attracts: Butterflies
Tolerates: Deer, Drought, Clay Soil, Dry Soil, Shallow-Rocky Soil

The Missouri Botanical Garden designates the Pale Purple Coneflower as “Tried and Troublefree.”

6. Rough Blazing Star, *Liatris aspera*, selected by the KCNPI work group for its summer, purple color



Height: 2.00 to 3.00 feet
Spread: 1.00 to 1.50 feet
Bloom Time: August to October
Bloom Description: Purple
Sun: Full sun
Water: Dry to medium
Maintenance: Medium
Flower: Showy, Good Cut
Attracts: Birds, Hummingbirds, Butterflies
Tolerates: Drought, Dry Soil, Shallow-Rocky Soil

7. Golden Groundsell, *Packera obovata*, selected by the KCNPI work group as living mulch, and for its late spring, yellow bloom



Height: 1.00 to 1.50 feet
Spread: 0.50 to 1.00 feet
Bloom Time: April to June
Bloom Description: Yellow
Sun: Full sun to part shade
Water: Medium to wet
Maintenance: Medium
Suggested Use: Ground Cover, Naturalize, Rain Garden
Flower: Showy
Attracts: Butterflies

1. RECOMMENDATION —

ANNUALS TO NATIVE PERENNIALS (CONT'D)

In some locations, the Parks Department may want to include structural plants. If so, the KCNPI work group recommends three.

1. Shining Bluestar, *Amsonia illustrus*



Height: 2.00 to 3.00 feet
Spread: 2.00 to 3.00 feet
Bloom Time: May
Bloom Description: Blue
Sun: Full sun to part shade
Water: Medium
Maintenance: Low
Suggested Use: Rain Garden
Flower: Showy, Good Cut
Leaf: Good Fall Color
Tolerates: Deer, Drought, Clay Soil

2. Whorled Milkweed, *Asclepias verticillata*



Height: 1.00 to 2.50 feet
Spread: 1.00 to 2.00 feet
Bloom Time: June to September
Bloom Description: White
Sun: Full sun to part shade
Water: Dry to medium
Maintenance: Low
Suggested Use: Naturalize
Flower: Showy
Attracts: Hummingbirds, Butterflies
Tolerates: Deer, Drought, Dry Soil

3. Shrubby St. John's Wort, *Hypericum prolificum*



Height: 1.00 to 5.00 feet
Spread: 1.00 to 4.00 feet
Bloom Time: June to August
Bloom Description: Yellow
Sun: Full sun to part shade
Water: Medium
Maintenance: Low
Suggested Use: Hedge
Flower: Showy
Tolerates: Drought, Erosion, Clay Soil

1. RECOMMENDATION —

ANNUALS TO NATIVE PERENNIALS (CONT'D)

Work Plan and Timeline

The KCNPI work group recommends staggering the transition of annual beds to native perennials in conjunction with an ongoing hands-on training program for Parks' Landscape staff. See Attachment A for the Sustainable Parks Workplan and Timeline.

YEAR ONE: Parks Department and KCNPI Partners identify 10-12 annual beds to transition to the above-listed native perennials. KCNPI recommends its partners team with Parks' staff to install and maintain the new native gardens throughout the season. (Additional training recommendations follow.)

YEAR TWO: Parks Department and KCNPI Partners identify the next 10-12 annual beds to transition to native perennials. In year two, KCNPI recommends its partners will not only team with Parks' staff to install and maintain the new gardens, but also help mentor staff on monitoring the gardens from year one.

YEAR THREE: Many landscape positions are entry level and are high attrition positions. For this reason, ongoing training is recommended for Parks' landscaping staff. Regardless, in year three, the Parks Department takes responsibility for all 20-24 native beds. Also, in year three, consider transitioning additional annual beds to perennial natives.

Training

KCNPI's work group recommends a series of repeated, annual trainings for Parks' landscaping staff. The group recommends annual trainings as many of these positions are entry-level and turn-over is relatively high. Some of the trainings will be hands-on trainings at native beds and others will not.

Prior to the trainings, KCNPI recommends convening landscape and other affiliated staff to participate in a round table discussion. This discussion will provide an opportunity to create buy-in from existing staff and will offer conveners an opportunity to listen. The KCNPI group also recommends field trips to existing native plant beds as part of this gathering.

Workshops

- 1. Introduction to Natives:** This training will include the importance of natives in our ecological landscape and agricultural industry as well their regenerative role.
- 2. Native Plant Installation and Management:** This series of hands-on trainings will take place at new native landscaping beds. To enhance learning, participants will receive a manual of the selected native plants in their various stages as well as a weed and invasive exotics identification manual.
- 3. Cross-Training:** KCNPI recommends a cross-training program with staff within Parks and other City agencies to learn best practices and develop mentoring relationships.

2. RECOMMENDATION —

ADDRESS THE USE OF TURF GRASS IN PARKS, AND REDUCE TURF BY FIVE PERCENT (EXCLUDING GOLF COURSES AND SPORTS FIELDS) IN FIVE YEARS.

The Kansas City Native Plant Initiative (KCNPI) convened a work group of large landscape managers to provide recommendations to the City of Kansas City, Missouri Parks Department to reduce turf grass by five percent in five years. The Department has approximately 4,000 acres of turf grass that it mows regularly.

More than 1,300 acres of the Parks Department's managed turf is devoted to sports fields and golf courses. Additional turf areas are available for scheduled or passive recreational use. Because turf facilitates the recreational use of these areas, the KCNPI work group discourages their replacement with native species. In Kansas City's climate, most turf grass relies on regular irrigation and fertilizer to maintain a lush, green lawn for recreation. While integrated pest management (IPM) strategies are included in KCNPI's recommendations, the KCNPI work group agrees that keeping the existing turf is more sustainable than replacing sports fields with artificial turf.

In most non-sports turf areas, the Parks Department does not employ IPM strategies nor does it irrigate. Replacing this turf with native species remains the most sustainable solution. Established native grasses thrive with reduced mowing, providing cleaner air and quieter neighborhoods. Native plants have deeper roots than turfgrasses and therefore help manage storm water by increasing rain infiltration. Native grasses also provide habitat for butterflies and pollinators.

With the Parks Department, the KCNPI work group identified 112 acres of turf ranging in size from 1.5 to 17 acres. To determine the best, most likely to succeed, habitat for these acres, the KCNPI work group recommends a site assessment to include historical data, to determine what grew there prior to development, and topography to determine water flow.

Transitioning turf grass to native species requires years of time and significant resources. Despite their evolution to thrive in this climate, native plants cannot at first outcompete the invasive species that have replaced them. Prior to the westward expansion, nature and Native Americans regularly burned prairie, which reduced woody species. After settlers moved into the area pioneers repressed fire, allowing trees to thrive and inhibiting native, prairie grasses. Moreover, settlers brought plants with them, some of which are aggressive and outcompete native grasses.

Replacing turf acres with native species will require significant chemical treatment in the beginning to kill off the existing seed bed of non-natives. It will also require some mowing over time to keep the non-natives at bay while the native species germinate and grow. Over time, the native grasslands will require less mowing, but spot-treatments of invasive species will be an ongoing and essential task.

2. RECOMMENDATION —

ADDRESS THE USE OF TURF GRASS IN PARKS, AND REDUCE TURF BY FIVE PERCENT (EXCLUDING GOLF COURSES AND SPORTS FIELDS) IN FIVE YEARS. (CONT'D)

Resources

The KCNPI work group recommends the Parks Department commit significant resources to native turf plant management. Specifically, the group recommends a *Reimagined Conservation Corps*:

- One full-time Ecologist who reports directly to the Superintendent of the Parks Department. This position is charged with managing Parks' natural resources. Specific responsibilities include transitioning and managing large landscape habitats as well as smaller native plant beds in the Parks system. Please see Attachment B, Johnson County Parks & Recreation's job description for this position.
- Reporting to the full-time Ecologist are three forepersons, one assigned to each district. Please see Attachment C, Johnson County Parks & Recreation's job description for these positions.
- Spring through fall, each foreperson will also be supported with two seasonal staff members per district.
- AmeriCorps² and Missouri Master Naturalist volunteers are an avenue for additional year-round support.

Finally, in addition to appropriate staffing, the Parks Department will need to invest in equipment and seed for transitioned acreage. The KCNPI work group estimates this would cost up to \$2,000 per acre. After a period of five years, however, a successful native grass area could offset seed purchases by harvesting seeds from Parks' properties.

It is worth noting that the first five years of a project of this type is the most expensive. Costs will reduce over time, and costs will be significantly more manageable if the transitioned sites are prepared appropriately.

General recommendations

- Whenever possible, select contractors that are native plant savvy.
- To address Ozone Alert days and air pollution, the Parks Department has already replaced its gasoline mowers with propane-powered alternatives. Propane mowers do not contribute to ground level ozone. These mowers emit 15 percent fewer greenhouse gases than gasoline and 40 percent less carbon dioxide. With ratings well under EPA and CARB emissions requirements, the Department can continue to mow on a regular basis.
- As a significant portion of Parks' mowed areas are managed by contractors, KCNPI recommends the Department select contractors with propane fleets or find other ways to incentivize the preferred use of propane equipment.
- The Parks Department prefers grasses that are less than four feet tall, which allows walkers and other visitors better visibility. Where species taller than four feet are used, safety and visibility can be addressed by mowing edges.
- Some reduced mowing areas can be addressed with shrubs and trees.
- In areas with more than a 25 percent slope, cease mowing, especially where erosion is an issue.
- In transitioned areas, the Department should plan on a three-year mowing cycle for all areas. Due to their location, many of these areas cannot be managed with burns.
- Also, in the transitioned areas, maintain a ten-foot barrier from other landscapes to help keep invasive species at bay.

² <https://www.nationalservice.gov/programs/ameri-corps>

2. RECOMMENDATION —

ADDRESS THE USE OF TURF GRASS IN PARKS, AND REDUCE TURF BY FIVE PERCENT (EXCLUDING GOLF COURSES AND SPORTS FIELDS) IN FIVE YEARS. (CONT'D)

Work Plan and Timeline:

See Attachment A for the Sustainable Parks Workplan and Timeline.

YEAR ONE:

1. Create a new division, a *Reimagined Conservation Corps*, to include Parks budget line items, personnel policies, job announcements and hiring.

As soon as hired, the Department's new Ecologist will work with an outside contractor for training purposes (see item 3 below) and hire a team of forepersons.

Simultaneously with the preparation, seeding, and initial maintenance of pilot plantings, this new team will assess and prioritize additional acreage for turf removal. The team should prioritize in the following order:

- Succession in historically wooded areas
- Remnant areas for rehabilitation
- Restoring turf areas to native grasses

With these factors in mind, identify the acreage to be addressed in the second year of this program.

2. A successful communication strategy is a key part of this plan. Create a public relations and marketing plan for city residents and businesses to communicate benefits of changes to landscaping practices. This plan will include news articles, appropriate signage for newly unmowed areas, and talking points for front-line staff members as well as 311 operators. See *Communications Strategies* for more details.

3. Identify three highly visible pilot areas to transition turf grass to native perennials and hire an outside contractor to begin transitioning these areas. KCMO Parks has already identified 18 areas, totaling 112 acres, for possible turf reduction. From these areas, KCNPI recommends piloting programs at

- a. Tiffany Springs, North District, five acres,
- b. Penn Valley, Central District, 11 acres, and
- c. Minor Park, South District, eight acres.

The contractor will be not only be tasked with site preparation, but also with the cultivation of an "Instagram-worthy" planting. Site preparation must kill off the existing seedbed of non-natives and invasive species. Planting a native species cover crop with beautiful, long-lasting blooms, like *Coreopsis tinctoria*, will positively impact the communications strategy and resident acceptance.

This contractor will also work side-by-side with the new Conservation Corps to provide training for ongoing management of these three sites as well as prepping and seeding new sites.

YEAR TWO:

1. With the support of an outside contractor, staff and contractor will continue managing the three pilot areas.
2. Implement an annual training curriculum for all Parks' staff, particularly Conservation Corps members, to include Integrated Pest Management, Fire as a Management Tool, Invasive Species Identification, and Exotic Species Removal, to name a few.

2. RECOMMENDATION —

ADDRESS THE USE OF TURF GRASS IN PARKS, AND REDUCE TURF BY FIVE PERCENT (EXCLUDING GOLF COURSES AND SPORTS FIELDS) IN FIVE YEARS. (CONT'D)

3. From the acreage previously identified by parks, prioritize the next five sites for turf reduction based upon
 - a. opportunities to reduce erosion,
 - b. opportunities to increase native habitat,
 - c. proximity to existing habit areas,
 - d. turf areas with a 15-25 percent slope or greater, and
 - e. opportunities in riparian areas for bare root seedling planting.

Conduct site assessments on the identified five areas to plan for implementation of appropriate and successful native species here, along with appropriate maintenance.

YEAR THREE:

1. The Kansas City, Missouri Parks Department's Conservation Corps assumes full responsibility for ongoing maintenance of the original pilot areas.
2. Continue annual training programs.
3. Prepare, plant, and begin to manage the five new turf reduction sites identified in Year Two.
4. From the acreage previously identified by Parks, prioritize the next five sites for turf reduction based upon criteria listed above and conduct site assessments.

YEAR FOUR:

1. Prepare, plant, and begin to manage the five new turf reduction sites identified in Year Three.
2. From the acreage previously identified by Parks, prioritize the next five sites for turf reduction based upon criteria listed above and conduct site assessments.
3. Examine Parks' land for larger acreage opportunities to create large swaths of habitat.
4. Begin to consider boulevard acreage and golf course roughs for next phase of turf reduction.

YEAR FIVE:

1. Prepare, plant, and begin to manage the five, new turf reduction sites identified in Year Four.
2. From the acreage previously identified by Parks, prioritize the final five sites for turf reduction based upon criteria listed above and conduct site assessments.
3. Examine Parks' land for turf reduction opportunities on significant acreage to create large swaths of habitat.
4. Prioritize Boulevard opportunities and golf course roughs based on
 - a. opportunities to reduce erosion,
 - b. opportunities to increase native habitat,
 - c. proximity to existing habit areas, and
 - d. turf areas with a 15-25 percent slope or greater.

Perform site assessments on the prioritized areas for implementation subsequent years.

5. From successful native plantings implemented in Years One and Two, begin seed collection program to reduce the need for ongoing seed purchases. Collecting seed in-house is valued at \$500/hour.

3. RECOMMENDATION —

REDUCE WATER USE BY 10 PERCENT IN THREE YEARS

The Kansas City Native Plant Initiative convened a work group of 11 professionals with expertise in water conservation. The group recommended water conservation strategies in annual beds and facilities maintained by Parks employees as well as contractors.

General Recommendations

FLOWER BEDS:

- Transitioning 20 percent of the Parks Department’s annual beds to perennial natives will significantly reduce water use after Year Three, when the native plants are established. Native perennial plants have deeper root systems than annual flowers and are adapted to survive in this geography.
- Currently, beds are watered according to a schedule, disregarding drought and precipitation. This can lead to the over- or underwatering of flower beds. For new native plantings, regular watering is necessary during establishment periods. This will keep the plants healthy as well as aesthetically pleasing. To address this, the work group recommends the Department install smart irrigation or moisture-sensing systems and use this data to prioritize and assign work orders to staff. These sensors can be integrated with Cartegraph to schedule on-demand watering as opposed to scheduled watering. Cartegraph is a centrally managed, cloud-hosted system that collects and manages Parks Department data. Furthermore, a dispatcher will further increase efficiency in water, equipment, and staff time use to prioritize work orders and routes.
- Schedule watering before 10 a.m. to reduce evaporation. Mornings are cooler and winds tend to be calmer so water can soak into the soil and be absorbed before evaporation.
- Healthy soils are more permeable and reduce run-off, erosion, and flooding. The Parks Department should hire a soil scientist to assess the water capacity of plant beds and amend soil conditions to maximize water retention and increase plants’ abilities to hold water.
- For each landscaping bed, determine the location’s baseline water data using the EPA’s WaterSense Water Budget Tool. For instance, in the 64111 zip code, a traditionally landscaped, 200-square-foot bed would require a baseline of 926 gallons of water per month. Conversely, an efficiently planned landscape would only require 648 gallons per month. This efficient landscape can use 30 percent less water.
- At Parks facilities, install rain barrels to collect rain water for irrigation. At Parks spraygrounds, install cisterns to collect water. Use these sources to supply water to Parks planted beds.
- Contractors should adhere to the same water conservation strategies as the Parks Department staff. This includes relying on water sensors to schedule bed watering and watering before 10 a.m. A quality assurance supervisor can help keep contractors compliant.
- KCNPI recommends a minimum of 20 percent of annual beds be transitioned to native perennials in two years. For the non-transitioned beds:
 - Group plants according to their water needs. Use a hydrozone approach to landscape design.
 - Design landscapes with full vegetative cover, as opposed to individual plants surrounded by mulch, to create microclimates and reduce water.

3. RECOMMENDATION —

REDUCE WATER USE BY 10 PERCENT IN THREE YEARS (CONT'D)

FACILITIES:

- During regular maintenance at existing facilities, retrofit impervious surfaces to retain 1.4 inches of water during rain events.
- For irrigation systems and fountains, install a leak detection system. These systems are able to identify water pressure changes indicating leaks.
- Consider retrofitting park facilities to keep as much water on property as possible.
- Within Parks Department buildings, foster a culture of water conservation.
 - Fill the sink and turn off the tap when washing dishes in community kitchen areas.
 - When using the dishwasher, wash only full loads.
 - Look for and report leaky bathroom and kitchen fixtures, or any other leaks, to the appropriate personnel.
 - Sweep instead of hosing off sidewalks, kitchen floors, or other areas.
 - Report irrigation occurrences during less efficient times, including during the middle of the day or when it is raining.
 - Report broken or improperly positioned irrigation sprinkler heads that spray water on sidewalks or pavement.
- Also within Parks Department buildings, install water conserving equipment, including
 - Toilets
 - Urinals
 - Faucets
 - Showerheads
 - Commercial dishwashers
 - Commercial ice makers

PRIORITIZATION MATRIX

When considering the above recommendations, the Parks Department may find the following matrix useful. The higher the combined score, the better the opportunity to reduce water use.

	1	2	3	4	5
Gallons Saved					
Ease of Implementation					
Cost					
Educational Opportunities					

Key:

- Gallons saved, 1 is a lot, 5 is very little.
- Ease of implementation, 1 is easy, 5 is difficult.
- Cost, 1 is inexpensive and 5 is expensive.
- Educational opportunities, 1 provides significant opportunity, 5 very little.

3. RECOMMENDATION —

REDUCE WATER USE BY 10 PERCENT IN THREE YEARS

(CONT'D)

DATA TRACKING

On its work orders, the Kansas City, Missouri Parks Department reports the number of gallons provided to specific plant beds each day.

- Where irrigation systems are not in use at flower beds, the KCNPI work group recommends installing a meter on Parks Department watering trucks. When watering, Parks' staff can report measured water use, GPS location, and time data via Cartegraph. This central, cloud-based tracking system will allow the Department to monitor water use over time. It is anticipated that following KCNPI's sustainability recommendations will reduce water use by at least 10 percent after three years.
- Tracking this data, centrally and over time, will also allow Parks' staff to highlight periods of unusually high or low precipitation. Droughts and unusual rainy seasons can be factored into a statistical analysis to ensure the Parks Department's goal of 10 percent reduction is being met.
- For facilities, tracking water use through water meters will provide data for year-over-year tracking.

4. RECOMMENDATION —

INTEGRATED PEST MANAGEMENT AND FERTILIZERS, BEST MANAGEMENT PRACTICES

KCNPI convened a work group of expert partners to provide recommendations to reduce chemical use in the Kansas City, Missouri Parks & Recreation system. The work group emphasizes that best practices rely on integrated pest management (IPM). As opposed to traditional pest control which relies on a scheduled application of pesticides, IPM focuses on preventing pest infestation and uses pesticides only as needed.

For all park types, the KCNPI work group recommends the following:

1. Establish *Action Thresholds* for pests. An action threshold is a pest population level that is a nuisance, health hazard, or economic threat.
2. Schedule seasonal evaluation and analysis of Parks' lands, particularly those with regular chemical applications. The evaluation should include:
 - A comprehensive soil analysis
 - Visual observation
 - A review of the previous season's use, annual use, the chemicals used as well as what was treated
 - Identify weak turf grass areas. The best way to reduce chemicals is to have the healthiest stand of turf possible.
3. Spot-spray areas instead of broadly applying the treatment.
4. Wherever possible, the KCNPI work group recommends choosing non-chemical solutions first. In order of priority:
 - Preventing pests and diseases by minimizing conditions that attract them.
 - Cultural solutions use best maintenance practices to minimize pests through pruning, sanitation, cultivation, mulching, and nutrient management.
 - Physical solutions remove dead or infected plants and utilize physical barriers to prevent the spread of pests.
 - Mechanical solutions remove weeds. Examples include a weed wrench and disrupting soils with plows and rototillers.
 - Biotic solutions control pests using natural enemies or beneficial organisms. For example, golf courses may consider managing grubs with nematodes.
 - Only use chemical solutions when the pest is most vulnerable and natural predators are in hardy life stages. When possible, spot-treat areas instead of broad applications. Finally, try to rely on nontoxic, non-residual chemicals or alternatives like soaps, oils, and bacterial preparations.
5. Develop talking points for frontline employees and 311 operators to answer citizen phone calls regarding chemical applications.

CERTIFICATION AND TRAINING

Pesticides and fertilizers are used in a variety of Parks' settings, and their frequency of application varies by site use. For example, golf courses and sports fields require more chemical management while beds landscaped with native plants require less. Regardless of site selection, Parks' staff charged with managing these locations will benefit from ongoing training and chemical certification by Parks' supervisors. Chemical certification should be included on job descriptions to ensure compliance.

1. Require supervisors who oversee staff who apply chemicals to have Chemical Certifications in appropriate areas: turf, aquatic, noxious, etc. This is especially important at golf courses, sports fields, and new native grass areas. Consider requiring fire management training as well.

4. RECOMMENDATION —

INTEGRATED PEST MANAGEMENT AND FERTILIZERS, BEST MANAGEMENT PRACTICES (CONT'D)

2. Schedule IPM training programs for new employees and all staff who apply chemicals as part of an ongoing Environmental Education Training Program. IPM training will include:
 - a. Labeling and transporting chemicals
 - b. Disposing of chemicals
 - c. Mixing safety
 - d. Clothing and safety equipment
 - e. Spot-spray training, especially for those who work with native landscapes
 - f. Weather protocols, for instance rain, high temperatures, and inversions
 - g. Emergency Protocols, knowing the chemicals' modes of action and being able to interpret warning symbols
 - h. Review Safety Data Sheets (SDS).
 - i. Review chemical tracking system. See "Documentation" below and Attachment D.
 - j. Address different plant species and how to best treat them. For example, systemic chemicals are only effective when a plant is growing.
3. Perform regular equipment checks to ensure proper applicator calibration.
4. Establish and enforce "no spray" buffer zones and avoid sensitive areas like playgrounds and dog parks.
5. Establish a protocol for signage placement to alert residents when spraying. Determine the appropriate length of time to keep sign in place and schedule removal.
6. Require outside contractors to adhere to these same standards.

IPM MANAGEMENT STRATEGIES

With a spectrum of uses for park land, the KCNPI work group recognizes a range of chemical use from greater to lesser:

golf courses and sports fields ➡ turf acres transitioned to native ➡ native beds and non-treated turf

1. Golf Courses and Sports Fields

Golf courses and sports fields rely on chemical applications more than any other park area. For this reason, training and ongoing educational opportunities should be prioritized for these staff members. Where contractors manage fields, require them to adhere to the same practices as the Department.

- To decrease chemical applications, determine and maintain optimal mowing heights on greens, tees, and fairways that lead to easy daily management while not stressing turf.
- Conduct a soil analysis to assess soil structure, nutrient presence and absence, organic content, water infiltration, compaction, and biotics.
- Use the results of the soil analysis to monitor and improve soil health with organic content, aeration, and better water infiltration.
- When necessary, apply fertilizers based upon soil test information.

4. RECOMMENDATION —

INTEGRATED PEST MANAGEMENT AND FERTILIZERS, BEST MANAGEMENT PRACTICES (CONT'D)

2. Turf Transitioned to Native Vegetation

Transitioning turf grass to native species requires a significant investment of time and resources. Replacing turf acres with native species will require significant chemical treatment in the beginning to kill off the existing seed bed of non-natives. Eventually, the native grasslands will require less maintenance, but spot-treatments of invasive species will be an ongoing task.

- Conduct a soil analysis to assess soil structure, nutrient presence and absence, organic content, water infiltration, compaction, and biotics.
- Use the results of the soil analysis to monitor and improve soil health with organic content, aeration, and better water infiltration.

3. Annual Beds

The City of Kansas City, Missouri Parks Department manages more than 100 annual beds throughout the City. These beds are currently treated with preemergent products and occasional pesticides throughout the season. In addition to replacing 20 percent of these annual beds with perennial native plants, further expanding the plan to replace more annuals with natives will reduce chemical dependence. Finally, when establishing new native landscape beds, consider sheet-mulching with corrugated cardboard to deter existing non-native species.

DOCUMENTATION

Ongoing, the Kansas City, Missouri Parks Department will be successfully reducing chemicals through IPM strategies and by facilitating healthy soil environments to reduce the need for fertilizers. These strategies can save money, improve habitat and water quality, and reduce the Department's carbon footprint.

Developing and requiring a systematic tracking of chemicals will help the Department document the use of pesticides, herbicides, and fertilizers over time. Each time a staff member applies a chemical, documentation must be required. Staff members should document:

- Location, e.g., GPS coordinates
- Wind speed and direction
- Chemical Type and Federal EPA number
- Amount
- Percent Strength
- Time

This data can be tracked on paper (see Attachment D), and/or uploaded to the Parks Department Cartograph system.

5. RECOMMENDED STEWARDSHIP GOALS

In the Kansas City, Missouri Parks Department's next strategic plan, KCNPI recommends stewardship goals and policies to promote a sustainable, regenerative environment.

General Recommendations

- Develop a system-wide Natural Resource Plan. The plan should include:
 - Goals and systems to increase biodiversity
 - An invasive species management plan
 - Continuous education for all staff to maintain, build, and create buy-in for natural resource conservation.
- Think regeneratively. A regenerative environment describes processes that restore, renew, or revitalize their own sources of energy and materials, creating sustainable systems that integrate the needs of society with the integrity of nature.
- Value the ecological work of parklands. Well-prepared, planted, and managed acres
 - reduce erosion,
 - reduce flooding,
 - capture storm water, and
 - sequester carbon.

NATIVE SPECIES

- Identify a specific goal to reduce the use of non-native species on Parks' (and City) properties.
- Increase the number of beds transitioned from annuals to perennials.
- Expand the palette of native perennial plant species for the Parks system.
- Create a strike list of invasive, non-native species (gingko, Callery pear, etc.) that will not be used on Parks' (and City) properties.
- All Parks' land should provide multiple functions, including habitat.
- Parks Department's land that includes streams and stream corridors should be managed for habitat and watershed health.
- Reducing turf through the transition to native plant species is a resource intensive project. With this investment, plan for the future by placing these areas under Conservation Protection.

WATER CONSERVATION

Consider water conservation in decision making, prioritizing, parks planning, redesign, and purchases.

- Foster a culture of water conservation and reuse with rain barrels, cisterns to harvest water, gauges to measure and track use, and detention ponds to alleviate run-off and erosion.
- Consider proximity to captured and harvested water in the planning of new planting beds.
- Analyze existing bed placements, their proximity to and ability to capture water.
- Prioritize slopes with grades greater than 15 percent for native landscapes to reduce run-off. Where winter sledding hills are affected, mow aisles at the end of the season.
- Parks' Properties:
 - For new construction, plan to retain 1.4" of water during rain events.
 - In new construction, limit 10 percent of the property to turf grass, excluding sports fields and golf courses.
 - Model *Low Impact Design (LID)* standards in new construction to reduce runoff. LID standards minimize soil disturbance and impervious cover. LID standards also include infiltrating, filtering, storing, evaporating, and detaining storm water runoff. Furthermore, by analyzing and mimicking pre-development land cover conditions, the Parks Department can enhance water management through increased storm water infiltration and carbon capture in newly reforested zones.

5. RECOMMENDED STEWARDSHIP GOALS

(CONT'D)

INTEGRATED PEST MANAGEMENT

Wherever possible, the KCNPI work group recommends choosing non-chemical solutions first.

In order of priority:

- Prevent pests and diseases by minimizing conditions that attract them.
- Cultural solutions use best maintenance practices to minimize pests through pruning, sanitation, cultivation, mulching, and nutrient management.
- Utilize physical solutions of removing dead or infected plants and placing physical barriers to prevent the spread of pests.
- Mechanical solutions can remove weeds and disrupt soils. Examples include using weed wrenches, plows, and rototillers.
- Biotic solutions control pests using natural enemies or beneficial organisms.
- Only use chemical solutions when the pest is most vulnerable and natural predators are in hardy life stages. When possible, spot-treat areas instead of broad applications. Finally, try to rely on nontoxic, non-residual chemicals or alternatives like soaps, oils, and bacterial preparations.

6. COMMUNICATION STRATEGIES

Both community and organizational acceptance are key to successful implementation of the sustainability plan. A communications strategy plans the flow of information both internally and externally to define organizational goals and create buy-in.

At minimum, KCNPI recommends the Parks Department engage in key internal and external communications.

INTERNAL COMMUNICATIONS

- Engage Parks' staff through regular trainings to increase their interest in sustainable activities.
- Provide regular updates to the Parks Board and City Councilmembers.

EXTERNAL COMMUNICATIONS

- Create talking points for front-line staff regarding new sustainable strategies.
For instance, if a caller complains about mowing, staff can answer that the Department is re-establishing a native prairie.
Similarly, if a caller laments the loss of a neighborhood bed of annuals, staff can encourage them to look for monarchs and birds because of the new native plants.
- At newly transitioned turf areas install easy-to-read, durable signs, e.g. "Urban Prairie Coming Soon, Do Not Mow."
- Similarly, when applying chemicals, place temporary signage, e.g. "Warning, Pesticide Applied to Park. Harmful to People and Pets."
- Highlight new native landscapes with press releases and social media including Facebook, Twitter, and Instagram. Look for opportunities to tell stories about pollinators, butterflies, birds, and their habitats.

To more fully gain acceptance of native plants by the City's residents and businesses, KCNPI recommends the Parks Department consider an expansive communications and marketing plan. KCNPI spoke with area marketing executives, and they estimate this plan and its implementation could cost \$150,000. However, it is possible to focus activities and choose strategic elements to lessen this cost. Moreover, collaborating on similar communications efforts, for example by MARC, may benefit both organizations.

A request for proposals (RFP) for professional services should request firm credentials and expertise in branding, marketing and communications strategy, and successful community outreach experience. Before issuing an RFP, KCNPI recommends reviewing other organizations' communications plans, budgets and deliverables to determine an appropriate price point for these services. A sample RFP can be found in Attachment E.

7. UNDERWRITING STRATEGIES

Kansas City's philanthropic community is one of the strongest and most generous in the country. Historically, however, most of these funds underwrite health and human service projects and not environmental or conservation programming.

The landscape, however, is evolving. While at this time local funders are unlikely to provide lead gifts for Parks sustainability efforts, they may be inclined to support smaller, targeted projects. Demonstrable large-scale success with other similar projects will help engage and inspire further involvement.

National and Federal grants are more likely to underwrite programs of the size and scale of the Kansas City, Missouri Parks Department. Their priorities are aligned with Parks' sustainability efforts. For this reason, KCNPI recommends prioritizing funding opportunities at this level.

Regardless of national or local funding sources, relationships are key. A strong relationship with an officer or key staff person can help guide and direct an application to more accurately align with a potential funder's priorities. Moreover, federal grants are detailed, time-consuming, and can be onerous. Missing one step can eliminate an excellent project from funding. KCNPI recommends hiring a professional grant writer with successful experience acquiring federal funding.

NATIONAL/GOVERNMENTAL GRANTS FOR RESTORATION WORK

The U.S. Forest Service and/or the U.S. Fish and Wildlife Service, the National Forest Foundation, and the National Fish and Wildlife Foundation have funding priorities that align with Parks' outcomes. These grants are typically dispersed via a state's Department of Natural Resources. Developing a strategic relationship with a DNR employee should help surface these opportunities as they arise.

Grant opportunities are announced with very short time tables. KCNPI recommends identifying and planning for grant opportunities well in advance of the announcement dates to allow adequate time for completion.

Two grant opportunities currently open through the National Fish and Wildlife Foundation that may be applicable are:

Environmental Solutions for Communities Grant

<http://www.nfwf.org/environmentalsolutions/Pages/home.aspx>

Monarch Butterfly and Pollinators Conservation Fund

<http://www.nfwf.org/monarch/Pages/home.aspx>

One grant opportunity currently open through the U.S. Forest Service that may be applicable is:

Landscape Scale Restoration

<https://www.fs.fed.us/managing-land/private-land/landscape-scale-restoration>

In addition, the U.S. Endowment for Forestry and Communities is seeking applications for the **2019 Healthy Watersheds Consortium Grant Program**

http://www.usendowment.org/images/HWC_RFP_Yr_4_2019_7.18.2018.pdf

When researching large grants, consider:

- Generally speaking, federal and national funders prefer opportunities with multiple stakeholders. Funding decisions are often made based on the robustness of a program. Are all the key players at the table and providing letters of support?
- Demonstrating multiple benefits of project outcomes and how those benefits support the missions of different community stakeholders is key.

7. UNDERWRITING STRATEGIES

(CONT'D)

- The Parks Department may serve as organizer and disseminator of funds to meet various project outcomes. Creating meaningful collaborations illustrates the ability to identify and partner with the best organizations suited to meet a particular need in a particular role. Parks may consider bringing on more institutional partners that will help with the overall management of the program.

KANSAS CITY PRIVATE FOUNDATION LANDSCAPE

While there are a handful of active private foundations serving Kansas City, most prioritize social issues over conservation causes. Further, the average gift size for environmental organizations from these foundations is less than \$10,000.

Private foundations will likely play a targeted role in Parks' sustainability project. Once the bulk of a project's projected costs are secured, local foundations may be willing to play the crucial role of completing the funding. This may also encourage foundations to stretch their typical gift size by supplying the final financial need to a project's budget. The other upside to this approach is it might encourage funding outside these local foundations' typical giving priorities.

KCNPI recommends building relationships with trustees and program officers of these foundations immediately. Many foundations will provide small amounts of trial funding to new grantees to test the ability of the grantee to deliver on a proposed project. Larger gifts are developed over time and require a successful track record of fiduciary and project management. Keep in mind that even with strong relationships in place, these foundations have track records of relatively small gifts.

Funding for this project will benefit from aligning project outcomes to goals outside the primary priorities of habitat restoration and conservation. Of particular and perennial interest to funders are improvements to human well-being. Strategically addressing this project to the well-being of residents, particularly those from under-resourced communities, will be beneficial to the project over all.

Local funders that do not explicitly prioritize funding environmental causes, but have a funding history include:

- Shumaker Family Foundation
- Burns + McDonnell Foundation
- Greater Kansas City Community Foundation
- William T. Kemper Foundation
- Dunn Family Foundation
- Skillbuilders Fund
- Mason L. Dean Charitable Trust

National Funders that have funded in Kansas City and express interest in funding environmental causes:

- Bank of America Charitable Foundation
- PNC Foundation
- Sprint Foundation

General Recommendations for Federal and Local underwriting

- Start networking and building relationships early.
- Think of ways to frame the outcomes of this project in ways that might appeal to more funders.
- Plan for private foundation funding to make up the last pieces of this project's funding rather than the first or the bulk.

8. SUMMARY

Native prairie, green spaces, forests, riparian zones, and other natural areas provide multiple benefits for the people who live or work near them. These natural resources are an important part of a community, and they benefit both people and the environment through *ecosystem services*. Ecosystem services clean our air and water, slow down flooding, trap carbon, and create cooler communities by reducing urban heat islands. Services also include pollination; healthy ecosystems have diverse pollinators and butterflies. One out of every four bites of our food rely on pollinators.

The Kansas City, Missouri Parks and Recreation Department's sustainability plan enhances the ecosystem services of its natural areas and reduces the department's ecological impact. The sustainability plan creates a more regenerative environment-- renewing, revitalizing, and restoring ecosystems where people and nature thrive together.

There are three fundamental recommendations. This endeavor requires significant resources in staffing and equipment. The ongoing success of these sustainability recommendations depends on regular staff trainings. And a strategic communications plan will encourage community support for native landscapes and a new landscaping aesthetic.

Top Recommendations

ANNUAL BEDS TO PERENNIAL NATIVES

- KCNPI recommends replacing 20 percent of the Parks Department's annual beds with native perennials in a two-year period.
- Replace entire annual beds with native perennials.
- The recommended list of "most likely to succeed" species provide texture, varied bloom seasons, have high success rates, and behave predictably.
- Due to increased demand for native plants, order as soon as possible.
- Implement a series of repeated annual trainings for Parks' landscaping staff.

TURF GRASS REDUCTION

- Reduce turf grass by 5 percent, excluding golf courses and sports fields in five years.
- Devote appropriate resources to manage the Parks' natural resources including staff funding for a Parks' Ecologist, District Forepersons, and seasonal staff.
- Invest in equipment and seed for transitioned acreage.
- Prepare soil appropriately to enhance the success of new native landscapes.
- Instead of native grasses, some reduced mowing areas can be addressed with shrubs and trees.

WATER CONSERVATION

- Reduce water use by 10 percent in three years.
- Transitioning 20 percent of Parks Department's annual beds to perennial natives will significantly reduce water use after native plants are established in Year Three.
- Install water sensors to water beds on-demand instead of on-schedule.
- Schedule watering before 10 a.m to reduce evaporation.
- Contractors should adhere to the same water conservation strategies as the Department.
- Within Parks Department buildings, foster a culture of water conservation.

8. SUMMARY

(CONT'D)

INTEGRATED PEST MANAGEMENT

- Begin using an Integrated Pest Management (IPM) approach to reduce chemical use.
- Establish Action Thresholds for pest management.
- Choose non-chemical solutions first: prevention, cultural, physical, mechanical, and biotic, with chemical last.
- Prioritize training and management in high-use areas like golf courses and sports fields. Require contractors to adhere to the same standards as the Parks Department.
- Require certification by management staff and provide ongoing, annual training for all staff who use chemicals.
- Document chemical use.

STEWARDSHIP GOALS

- In the Kansas City, Missouri Parks Department's next strategic plan, KCNPI recommends stewardship goals and policies to promote a sustainable, regenerative environment.

COMMUNICATIONS STRATEGIES:

- Engage Parks' staff through regular trainings to engage their interest in sustainable activities.
- Create talking points for front-line staff regarding new sustainable strategies.
- Provide regular updates to the Parks Board and City Councilmembers.
- At newly transitioned turf areas install easy-to-read, durable signs e.g. "Urban Prairie Coming Soon, Do Not Mow."
- Similarly, when applying chemicals, place temporary signage, e.g. "Warning, Pesticide Applied to Park. Harmful to People and Pets."
- Highlight new native landscapes with press releases and social media including Facebook, Twitter, and Instagram. Look for opportunities to tell stories about pollinators, butterflies, birds, and habitat.
- Consider hiring an expert consultant to create and manage an expansive communications and marketing plan.

UNDERWRITING STRATEGIES:

- National and Federal grants are more likely to underwrite programs of the size and scale of the Kansas City, Missouri Parks Department, and their priorities are aligned with the mission of Parks' sustainability efforts.
- Consider hiring a professional grant writer with successful experience acquiring federal funding.
- Local, private foundations are more likely to play a targeted role in the Parks' sustainability project.