Prairie Acre and Pollinators
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Introduction

Pollinators in the environment play important roles in our environment that go unnoticed to many people today. There are approximately 200,000 species around the world that act as
pollinators. Of these species, over 1000 are vertebrate pollinators including birds, bats, and small mammals. And the rest are invertebrates, including flies, beetles, butterflies, moths, and bees (USDA, 2005). Insects pollinate 75 percent of human food crops worldwide and pollinators are key species that play an incredibly important role in the life and diversity of ecosystems. Planting native plants in prairie restorations can benefit both pollinator habitats and native prairies. Alternative management practices other than pesticide use such as mowing will also greatly benefit pollinators, their habitats, and native prairies. Our research will show the importance of pollinators and why they are in decline. We also show what plants can be incorporated into Prairie Acre and the Triangle to implement pollinators. Finally, we discuss future projects for the Prairie Acre, Triangle, and around the University’s campus to increase pollinator habitats as well as community engagement opportunities to educate and bring more attention to pollinators and the Prairie Acre in regards to their importance to our environment.

General Pollinator Information

Pollinators play a large role in our everyday lives and they are responsible for many aspects of an ecosystem. Pollination occurs when a portion of the pollen from one plant get transferred to another plant, a pollinator creates this effect. This causes fertilization of the second plant and allows for the plants to grow and develop. The most common pollinators that we think of are Butterflies, Bees, and Birds. However, there are many pollinators that go unrecognized but are just as vital some of these are bats, moths, flies, beetles, ants, wasps and even some other mammals (USDA). These taxa work to pollinate flowers, fruits, and vegetables. When we think of pollinators we think of butterflies, birds, and bees due to their large population numbers and people tend to think of these groups as “pretty” and therefore they get more attention. Butterflies are important for the pollination of flowers, as that is their main food source. They drink the
nectar of flowers and pollinate the flowers as they jump from one flower to another. Birds are more vital to the success of fruit plants, or plants where the birds eat the seeds and the deposit them elsewhere. According to the United States Department of Agriculture, with more than 3,500 species of bees in the world, we rely on them heavily for pollination (USDA). They are the only group that can produce honey which is a common product found in most homes across America. According to an interview with Joseph Maloney, a Beekeeper at the Topeka Zoo “One hive can produce several hundred pounds of honey a year, but beekeepers only harvest a fraction of that. Maybe closer to 50 pounds.” This means that honey introduces an economical component into the lives of these pollinators. This is cause for concern because bee, and pollinators in general, populations in our world today on the decline.

Decline of Pollinators

A considerable amount of research has shown decline in pollinator populations to be attributed to use of pesticides and urbanization that can be addressed locally through individual and community actions. According to the Report on the National Stakeholders Conference on Honeybee Health from 2012, the USDA noted a correlation between mass deaths of bees known as “bee kills” and the use of neonicotinoids (USDA). Additionally, these neonicotinoids have been found to repel flies and beetles vital to pollination—especially in prairie systems (Easton). While these pesticides have the purpose of killing pests, there have been notable effects outside of these specific insect species. The American Bird Conservancy did a study in 2013 that found the neonicotinoids were as hazardous to the health of birds as they are to bees from the consumption of sprayed seeds—with effects ranging from immune suppression, paralysis, and reproductive toxicity that can inhibit reproductive capabilities or pass on to offspring (American
Bird Conservancy). However, another problematic component to addressing local scales of pollinator population decline is urbanization.

The spread of urban development across the country has had an effect on what is left as habitat for pollinators. For example, there has been concern regarding the lack of milkweed—known to thrive in prairie systems—vital to Monarch butterflies as a food source and habitat for larvae (National Research Council). While there are other factors that have affected the monarch and other butterfly varieties, the removal of the plant for agricultural and urban development is no less damaging to the population and only exacerbates the fragmentation of their habitat. This has resulted in fragmented landscapes that require increased migration by pollinators for resources outside of their local habitat. Studies performed on commercial bees have found that access to food is one of the biggest factors in longevity and prone to stress induced illness as the need for migration for resources increases (Tarpy). This coincides with the lack of floral diversity that comes with the urbanization process. It has been noted that such illnesses can be induced by pathogens and parasites—including those contributing to the decline in Bumble Bees, as commercial bees with low genetic diversity susceptible to these lethal parasites that infect wild populations (Meeus et al. 663). While pesticide use and urbanization effects on pollinators can be assessed on small and large scales, the effects of climate change and specific issues such as Colony Collapse Disorder must be looked at on larger scales as they have multiple factors contributing to these problems.

The effects of climate change on pollinator populations remain an important area of study, but research on changing flowering times and pollinators specialized and/or generalized niches provide some insight. In addition the stresses caused by urbanization, the Environmental Protection Agency indicates habitat change can be a result of local changes in climate such as
temperature the pollinating species (EPA). While some are seen to have possible beneficial outcomes—such as the increased production of nectar in some plants—these times have been found to be at odds with hatching and migratory times for some species resulting in a lack of pollination for dependent floral species and food source scarcity for the pollinators (National Research Council). These stresses have been noted to possibly contribute to the prevalence of Colony Collapse Disorder in honey bees—in which a sudden loss of a colony’s worker bees occurs that prevents the sustainment of the hive. The factors described can be a cumulative reason for the prevalence of CCD—as they tend to occur in conjunction with each other (EPA). This is something to consider when looking at Prairie Acre due to the various ways pollinators are affected and stressed in this area. Different pesticides used on and around campus, the fragmentation of campus that doesn’t have enough diversity to sustain pollinating populations, and the practices of local beekeepers that may affect wild populations cultivated around campus are factors that must be assessed to fully understand how diverse pollinator populations can thrive in Prairie Acre.
Pollinators in Kansas

Some of the most common pollinators in Kansas are butterflies, bees, birds, flies and beetles. According to Kathy Denning, beetles and flies are the some of the most important prairie pollinators. She informed us that beetles are underrepresented because they spend their days buried underground and people don’t see them as much as larger pollinators, but when they come out they are vital to the pollination of prairie plants. Flies are also important because they are very common and they are attracted to fragrant flowers and pollinate as they go. Bees play an important role in Northeastern Kansas because of their pollination of flowers. The most common species of butterfly in Northeastern Kansas are the Black and Yellow Swallowtails, Monarchs, Regal Fritillary, Red Admiral, and the Painted Lady. All of these species can be found throughout the Douglas County area. Monarch Butterflies are very common as their annual migration goes through Douglas County in the early fall. These butterflies migrate from Canada to Mexico each and every year. We are fortunate at the University of Kansas because we have a leading expert in the field associated with our university, Chip Taylor. Chip Taylor is the director of Monarch Watch which works to provide waystations and educate people on the importance of pollinators. In general, people in general are becoming more aware of the struggles that bee populations are facing and are working on steps to help increase their populations.

Prairie Acre Plant Species and Pollinators

The purpose of the following table 1 (a-c) is to demonstrate a condensed list of forbs that are present in prairie acre. The table is separated into five categories: bloom time, scientific name, common name, pollinator relationships, and image of each species. It is important to highlight the variation of pollinators from one species to another. The bolded portions are
pollinators that are less common. It is essential to support forbs that bring variety into the pollinator species mix.

*Table 1a*

<table>
<thead>
<tr>
<th>Bloom Time</th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Pollinator Relationships</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Spring</td>
<td>Baptisia australis</td>
<td>Blue Wild Indigo</td>
<td>Bumblebees, Butterflies, Moths</td>
<td>![Picture 1]</td>
</tr>
<tr>
<td>Early Spring</td>
<td>Viola pedatifida</td>
<td>Prairie Violet</td>
<td>Bees, Butterflies, Moths, Flies, Beetles</td>
<td>![Picture 2]</td>
</tr>
<tr>
<td>Early Spring</td>
<td>Oenothera speciosa</td>
<td>Showy white Evening Primrose</td>
<td>Nocturnal insects</td>
<td>![Picture 3]</td>
</tr>
<tr>
<td>Early Spring</td>
<td>Dalea purpurea</td>
<td>Purple Prairie Clover</td>
<td>Bees, Butterflies, Moths, Flies, Beetles</td>
<td>![Picture 4]</td>
</tr>
<tr>
<td>Early Summer</td>
<td>Asclepias tuberosa</td>
<td>Butterfly Milkweed</td>
<td>Bees, Moths, Butterflies, Hummingbirds, wasps</td>
<td>![Picture 5]</td>
</tr>
<tr>
<td>Early Summer</td>
<td>Coreopsis palmata</td>
<td>Finger Coreopsis</td>
<td>Bees, Butterflies, Moths, Flies, Beetles</td>
<td>![Picture 6]</td>
</tr>
<tr>
<td>Early Summer</td>
<td>Ruellia humilis</td>
<td>Fringe-leaf Ruellia</td>
<td>Long tongued bees</td>
<td>![Picture 7]</td>
</tr>
<tr>
<td>Season</td>
<td>Species</td>
<td>Flower Type</td>
<td>Pollinators</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>--------------------</td>
<td>-------------------</td>
<td>-------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Mid Summer</td>
<td><strong>Helianthus molis</strong></td>
<td>Ashy sunflower</td>
<td><strong>Bumblebees, Miner bees, large Leaf-Cutting bees, Cuckoo bees, Green Metallic bees, and other Halictid bees</strong></td>
<td></td>
</tr>
<tr>
<td>Late Summer</td>
<td><strong>Cirsium altissimum</strong></td>
<td>Tall thistle</td>
<td>Bees, Butterflies, Moths, Flies, Beetles</td>
<td></td>
</tr>
<tr>
<td>Late Summer</td>
<td><strong>Helianthus grosseserratus</strong></td>
<td>Saw-tooth sunflower</td>
<td><strong>Bumblebee, Honey Bees, Monarchs</strong></td>
<td></td>
</tr>
<tr>
<td>Late Summer</td>
<td><strong>Helianthus maximilianii</strong></td>
<td>Maximilian sunflower</td>
<td><strong>Bumblebee, Honey Bees, Monarchs</strong></td>
<td></td>
</tr>
<tr>
<td>Late Summer</td>
<td><strong>Helianthus tuberosus</strong></td>
<td>Jerusalem-artichoke sunflower</td>
<td>Bees, Butterflies, Moths, Flies, Beetles</td>
<td></td>
</tr>
<tr>
<td>Late Summer</td>
<td><strong>Liatris punctata</strong></td>
<td>Western-dotted gayfeather</td>
<td>Bees, Butterflies, Moths, Flies, Beetles</td>
<td></td>
</tr>
</tbody>
</table>

*Table 1b²*
<table>
<thead>
<tr>
<th>Season</th>
<th>Plant Species</th>
<th>Companion Species</th>
<th>Bees, Butterflies, Moths, Flies, Beetles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Summer</td>
<td>Symphyotrichum ericoides</td>
<td>Heath aster</td>
<td>Bees, Butterflies, Moths, Flies, Beetles</td>
</tr>
<tr>
<td>Late Summer</td>
<td>Symphyotrichum oolentangiense</td>
<td>Sky blue aster</td>
<td>Bees, Butterflies, Moths, Flies, Beetles</td>
</tr>
<tr>
<td>Autumn</td>
<td>Ruellia humilis</td>
<td>Fringe Leaf Ruellia</td>
<td>Long tongued bees</td>
</tr>
<tr>
<td>Autumn</td>
<td>Liatris punctata</td>
<td>Western Dotted Gayfeather</td>
<td>Bees, Butterflies, Moths, Flies, Beetles</td>
</tr>
<tr>
<td>Autumn</td>
<td>Helianthus tuberosus</td>
<td>Jerusalem – Artichoke Sunflower</td>
<td>Bees, Butterflies, Moths, Flies, Beetles</td>
</tr>
<tr>
<td>Autumn</td>
<td>Helianthus maximilianii</td>
<td>Macmillian Sunflower</td>
<td>Bumblebee, Honey Bees, Monarchs</td>
</tr>
<tr>
<td>Autumn</td>
<td>Asclepias tuberosa</td>
<td>Butterfly Milkweed</td>
<td>Bees, Wasps, Moths, Butterflies, Hummingbirds</td>
</tr>
</tbody>
</table>

Table 1c

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Prairie Acre Triangle Expansion and Pollinators

Expanding Prairie Acre to the Triangle will include numerous challenges yet none so important as restoring the prairie to accommodate pollinator populations. Without consideration of pollinators, the growth and diversity of the Prairie Acre triangle will stagnate. In a study that examined tallgrass prairie restoration methods and bee diversity over twenty-eight different prairie restoration projects ranging from sizes less than one hundred acres to over ten thousand acres, only three projects began with explicit consideration for bee populations (Harmon-Threatt, et al). It is rare that pollinator populations are a top priority when prairie restoration projects begin. What follows is a clear plan of action to cater to pollinator populations regarding management and seed mixes for the beginning of the Prairie Acre triangle expansion.

In any habitat restoration, it is impossible to replicate the original habitat. An article on prairie restoration describes this when discussing species reintroduction. “But even with reintroductions there are limits to what a restored system can hold. Says Kline ‘We don’t pretend we’re getting anything like the original.’” (Mlot, et al) The triangle restoration needs to consider this when reintroducing plants as well as which seed mixes increase pollinator diversity. In a study in which seed mixes were examined in regards to their impact on pollinator diversity, four particular forbs were identified as having significant positive impact on bee populations. These species are *Amorpha canescens* (Fabaceae), *Dalea purpurea* (Fabaceae), *Ratibida pinnata* (Asteraceae), and *Zizia aurea* (Apiaceae). In this study, when seed mixes were amended to include these four forbs, there was significantly more bee species than those mixed with seeds selected at random (Harmon-Threatt, et al).
Figure 1 shows that the more seeds involved in an initial mix, the higher the diversity of bee species (Harmon-Threatt, et al). This is important as bees are the primary pollinators of prairie in the Midwest. Forbs are most influential in how diverse a prairie’s pollinator population becomes as data shows the more forbs within a prairie, the higher diversity of pollinators the prairie ecosystem will have. This also applies to other prairie plants as well as non-pollinators. “Seed mixes used to restore land offer an effective way to introduce a diversity of plants to new and existing restorations, but can vary significantly in the species richness of forbs which could, in turn, impact their ability to support and attract higher trophic levels.” (Harmon-Threatt, et al) In planting the triangle, forbs should be planted in the winter using broadcasting. Broadcasting is the practice of spreading a high amount of seeds around, typically by hand, and then lightly tilling the soil to plant the seeds, relying on gravity to deposit seed within the soil. Having an additional area for pollinators to thrive is key to fostering a healthy, campus-wide pollinator community. Waystations will also be vital in order for Prairie Acre and the Triangle Expansion to feel the full potential of positive effects of pollinators.
Waystations

With pollinators playing such a vital role in the ecosystem and their numbers in decline, steps need to be taken to ensure their best chance for survival. Waystations can help provide chances for pollinator’s survival that they may not have otherwise. Waystations are gardens or small areas that are planted with plants that provide food and shelter specifically for pollinators. Waystations are something that are inexpensive, can be created by almost anyone, and do not need a lot of space.

Monarch Watch is just one of the many places that helps promote the idea of Waystations. As of March 2017, Monarch Watch has over 15,000 registered Waystations (Monarchwatch.org). Waystations are important because they serve a variety of functions for multiple species. In the case of the Monarchs, the milkweed found in waystations serves as a stopping point for migrating Monarchs to feed. They also serve as an important source of food for growing larvae (Monarchwatch.org).

Waystations provide habitats for pollinators that may no longer be available or that has been destroyed by humans. The Journal of Ecology found that pollinators were most abundant and thrived when they traveled less than 25 meters (Arts & Waddington). By providing more Waystations this will allow pollinators to have better chances at survival. By making both Prairie Acre and the Triangle Waystations this would provide pollinators with two new habitats that would be close in distance and allow for better chances at survival.

Prairie Acre and the Triangle could both become Waystations without converting the whole area into a dedicated Waystation. There are requirements that different programs require for certification. Monarch Watch lists the following species in their starter kit for the region: Butterfly Weed (Asclepias tuberosa), Common Milkweed (Asclepias syriaca), Swamp Milkweed
(Asclepias incarnata), Indian Blanket (Gaillardia pulchella), Purple Coneflower (Echinacea purpurea), Joe Pye Weed (Eupatorium purpureum), Scarlet Sage (Salvia coccinea), Tithonia Torch, Mexican Sunflower (Tithonia), Zinnia, Dahlia Mix (Zinnia elegans). By adding these species in addition to current species in the Prairie Acre and working them into the plan for the Triangle it could help support pollinator populations.

Another important factor in considering Waystations is the money and resources that could be saved. Prairie plants use less energy and water than traditional landscaping methods (Sim & Singh). By adding more Waystations to campus and moving away from traditional landscaping practices it could serve a multitude of purposes. Once established most of the plants require little to no watering. This alone would help save money and cut down on water usage on campus. This would help promote a more sustainable campus.

Waystations also serve as an important educational tool. Pollinators often are an indicator of the health of an ecosystem. Without pollinators present, the ecosystem may be suffering (Kevan). By promoting healthy ecosystems and getting the local community involved this could increase the local pollinators population. Most Waystations are done by private citizens and can be purchased for less than twenty dollars. This provides people with the opportunity to do something good in their community and support pollinators. The Horticulturist at the Topeka Zoo said, “Not every person needs 10 acres of prairie for pollinators. If people used their back alley or garden and planted 15 to 20 plants it would do a lot” (Knight).

Future Projects

The goal of these future projects is to help decrease pollinator decline while targeting endangered and at risk species, such as the Regal Fritillary to help ensure their survival. While research is lacking that these projects can reverse pollinator decline we believe they are still...
helpful while bringing more attention to prairie acre, increasing biodiversity, and education on pollinator importance and decline.

**Green Roofs**

With habitat degradation of pollinators a growing problem another future project we propose would be implementing additional green roofs on campus. Currently, the Capital Federal School of Business has a seven-thousand square foot living roof. A green roof is a roofing alternative that transforms a roof into an ecosystem that can house communities of native plants and pollinator. (Ksiazek, et al, 2012) Green roofs are becoming more abundant in larger cities, and has been prevalent in Europe for many years. In the United States, Chicago is leading the way with 509 Green Roofs (City of Chicago, 2010), and a recent study done concerning the effectiveness of green roofs concluded that native plants did not experience pollen limitation and although there was a lower and slightly less diverse community on the roof, the insects provided sufficient pollinator services to the plants. (Ksiazek, et. al, 2012). Green Roofs can be designed at many different locations. Roofs have been found in Salt Lake City, atop the convention center for the Church of Jesus Christ of the Latter Day Saints, to New York, London, Toronto and Germany. Pollinators have been able to find roofs up to 20 stories high (greenroof.com). We propose that putting additional green roofs around campus would not only be environmentally sound but would attract more pollinators on campus and potentially to Prairie Acre. A green roof would thrive on top of the Union where there exists a small garden. According to an aerial view on campus, Westco, Ambler Student Rec, Watkins, and Malott among other places (buildings under current construction) would be good locations for green roofs as well. Not only could these roofs provide more habitat for pollinators but could serve as trial spaces for implementing native prairie plants with pollinators.
Pollinator Pathways

Another recommendation is to set up a pollinator pathway on or near the prairie acre. Pollinator Pathways connect fragmented landscapes between urban, suburban, and rural areas while incorporating principles of ecology and design in cities, making specific use of underutilized, existing infrastructure, in a growing partnership of design and ecology (Bergmann, 2007) (See Appendix A) Originally designed by Sarah Bergmann in the city of Seattle, the initial design is a mile long, 12 feet wide, and extends from Seattle University to a small woods habitat. Bergmann has worked with over 1500 volunteers, scientists, and urban planners since 2007 and the project is nearly halfway finished. Creating a pollinator pathway at Prairie Acre creates a challenge in regards to deciding where to take the pathway. An attempt to cross the road into the triangle presents an obstacle unless part of the road is closed off. We offer an alternate pathway that doesn’t start at Prairie Acre but is designed to educate and bring attention to it. A short pathway would start in front of Watson Library or in the green space in front of Fraser Hall. The path would follow the sidewalk down to Prairie Acre (See Appendix B) Using this pathway would allow us to utilize the staircase down to Prairie Acre to create a more thatchy area that is favored by Regal Fritillary (Debinski, 2010). By implementing pollinator attracting plants, native prairie grasses, and informative signs the pathway has the ability to transform Jayhawk Blvd. This project would need to be in collaboration with different departments and would take several years to implement.

Roadside Prairies

An example of pollinator pathways that could be implemented on campus are roadside prairies. The conversion of current landscapes adjacent to campus roadsides to native plant species can provide a great opportunity for developing linear, marginal habitats to support
pollinator populations. This could benefit pollinator populations by improving habitats on land that has already been set aside from further development and offering a mode of connectivity to fragmented habitats. According to a study conducted by Jennifer Hopwood, bee species richness and abundance of restored Kansas roadsides are similar to that of a prairie remnant (Hopwood). Developing linear areas adjacent to roadways as prairies would provide foraging space, expand available habitat, and serve as corridors for the movement and migration of pollinators in highly modified landscape such as The University of Kansas. Due to KU Prairie acre's location, it would be considered a remediated roadside prairie. The prospect of developing The Triangle adjacent to Prairie Acre an expansion of remediated prairie would create another roadside prairie habitat as it is surrounded on all sides by roadways. The previously suggested pathways on campus could be ideal stretches of available roadside land that would entail considerations of roadside prairie development and management practices. Due to the proximity to roadways, development and management involve more factors that must be considered than when remediating a prairie in lands that have less interaction with surrounding human activity.

First and foremost, the development of a roadside prairies must prioritize motorist and public safety before the sustainability of and benefits to pollinator populations, especially on a university campus. The Kansas Native Plant society suggests mowed "clear zones" at intersections and inside curves to provide an unobstructed line of sight for motorists (KNPS). Intermittent burning of the prairie for maintenance should be all controlled as the smoke from the process can adversely affect driver visibility. The proximity of habitat to roadsides can cause mortality sinks for the pollinators occupy it. According to a study by the Journal of Applied Ecology, "vehicles killed 0.6-1.9% of adults of species from closed populations [of butterflies], and 7% of those from open populations, mortalities insignificant compared to those caused by
natural factors" (Munguira & Thomas 325). Studies such as this demonstrate that the effects of road traffic have little impact on pollinator populations compared to the benefits to biodiversity as a result of roadside habitat development. To sustain populations of pollinators in roadside environments, density and availability of useable resources are paramount. Suitable pollinator habitats must include a diversity of flowering species and nesting substrates due to the specialized floral and nesting requirements of pollinators (Wcislo and Cane). With this in mind, the success of roadside prairies necessitates the availability of floral resources that are relatively dense throughout a large portion of the growing season for use in foraging. Along with resource availability in the growing season, there must also be sufficient nesting and wintering substrates for a vast array of pollinators. According to Kathy Denning, wintering and nesting substrates include wood, hollow stems from tall grasses, leaf litter, and available ground space for ground-nesting pollinators (Personal Comm. Kathy Denning).

Unlike agricultural areas and urban areas, roadsides are set aside from further developments and are neither disturbed by heavy equipment or plowed regularly. As with all prairie habitats, disturbance is necessary to mitigate woody invasions and promote biodiversity. According to the Iowa Department of Transportation, "Well-timed disturbances like mowing can improve species diversity in roadside prairies. Mowing several times during the first growing season of a planting project can control noxious weeds and help native plants establish, frequent mowing in subsequent years reduces native plant growth" (Highway Division Office of Design Roadside Development). Too frequent disturbances reduce floral resource availability, greatly impacting foraging abilities of pollinators. As suggested by the Wisconsin Department of Transportation, prescribed burning with an irregular cycle of 2-5 years or mowing during
dormant seasons would be sufficient in maintaining floral resources for use by pollinators while mitigating invasion of unwanted plants (Wisconsin Bureau of Highway Maintenance). All variables and factors considered, developing roadside prairies on campus could be a feasible option for helping sustain endangered pollinator species locally.

**Community Engagement**

A major way to help bring a pollinator population to prairie acre is to educate the community about ways that they can get involved to help. Education is a useful tool, and could be done through an informational mailer. Another main way would be through educational days that could happen on Prairie Acer. This could be days that the local community could come find out what the acre is and what it is about, since many people on campus outside of the environmental studies realm are unaware what it is, and the role that it plays in the pollinator population. This is a great way to educate and engage the community to hopefully draw an interested group that may look at ways to help on their own property.

With the new piece going in (the educational center part- need exact name) this could be a place that families can bring their children to and have pamphlets that provide them information about what is there, why the plants are important to pollinators and the landscape, and what they could do at home. This could also be an area that schools could take field trips to and with the help of a professor in environmental studies or students could help guide “tours”.

The main thing in the case of pollinators is providing the local community ways to get involved, and the resources to do so. Such as where to go to get seeds or plants, what will attract them, how do you become a part of the pollinator pathway or a way station. This is an area that the Seed Bank could also provide a free starter pack of seed potentially, that could also provide
instructions on how to gather the seeds and plant them again to grow their prairie. Additionally, if the pollinator pathway were to start it would be an interesting way to engage the community by having a website where locations are plotted with a forum that they are able to share and discuss what they are doing on their property with others and those who may want to get involved.

The main proposal would be for a website for Prairie Acre, that provides dates of plantings or educational days. This would allow the community to know what is coming up and could even allow them to subscribe for information and upcoming events around Lawrence. Additionally, information would be available about the importance of pollinators and prairie plants, and what families can do on their property to start a prairie bed of their own. This would be where the pollinator pathway map and forum could be as well and hopefully provide encouragement for others in the community to get involved. The key of the website would be a platform for the community to find information and resources needed all in one place that is accessible online about prairie plants and pollinators and how to get involved in growing the pollinator community of Lawrence.

The two key components to engaging the community is through education, information and resources. The Center for Sustainability may be the place to start and initiate community engagement, because they have an existing audience and potential resources to draw engagement to the acre. When there is days that the community can come help at the acre it will bring those interested, but make others interested when they hear it getting talked about. Additionally with the creation of the seed banks that continue to grow our network around Lawrence this will engage people through the connections and ties they have will create a chain reaction of creating
awareness. Bringing people to the acre and giving them resources they need to implement pollinator and prairie plants on their property would be the best way to engage them.

**The Future- Conclusion**

Since we are the pollinator group we would like there to be a larger implementation of pollinator plants that would make prairie acre and hopefully the triangle more attractive to pollinator species. Through the research our group did, we found that urbanization highly affects these populations, which is why we find it important for there to be pollinator pathways, way stations and green roofs that help create links between pollinator habitats to grow the population. Although research shows that these actions will not be able to increase the population it would help to maintain the population that we currently have, with the hope that we can continue to grow the pollinator habitat over the region.

We would also like to see the Lawrence community get involved in prairie acre and hopefully take the resources and information needed to bring pollinators to their property too, to continue to grow the community. Overall we would like to see more campus initiatives, both in prairie acre and around campus, and community engagement in creating a sustainable habitat for pollinators even though Lawrence is an urbanized area.
Works Cited


Highway Division Office of Design Roadside Development. 


Old landscapes feature a complex, interconnected web of habitats. This diversity provides ecological complexity and health—and multiple opportunities to connect plants and pollinators.

Large-scale farms and urban landscapes create large parcels of mono-habitats. They fragment rather than connect the landscape. They provide fewer and more fragile connections for plants and pollinators.

The Pollinator Pathway project connects landscape over existing ones, supporting pollinators, plants and humans.