Community Action and Pollinator Gardens:

A Case Study of Sustainability and Community

Chase Holden
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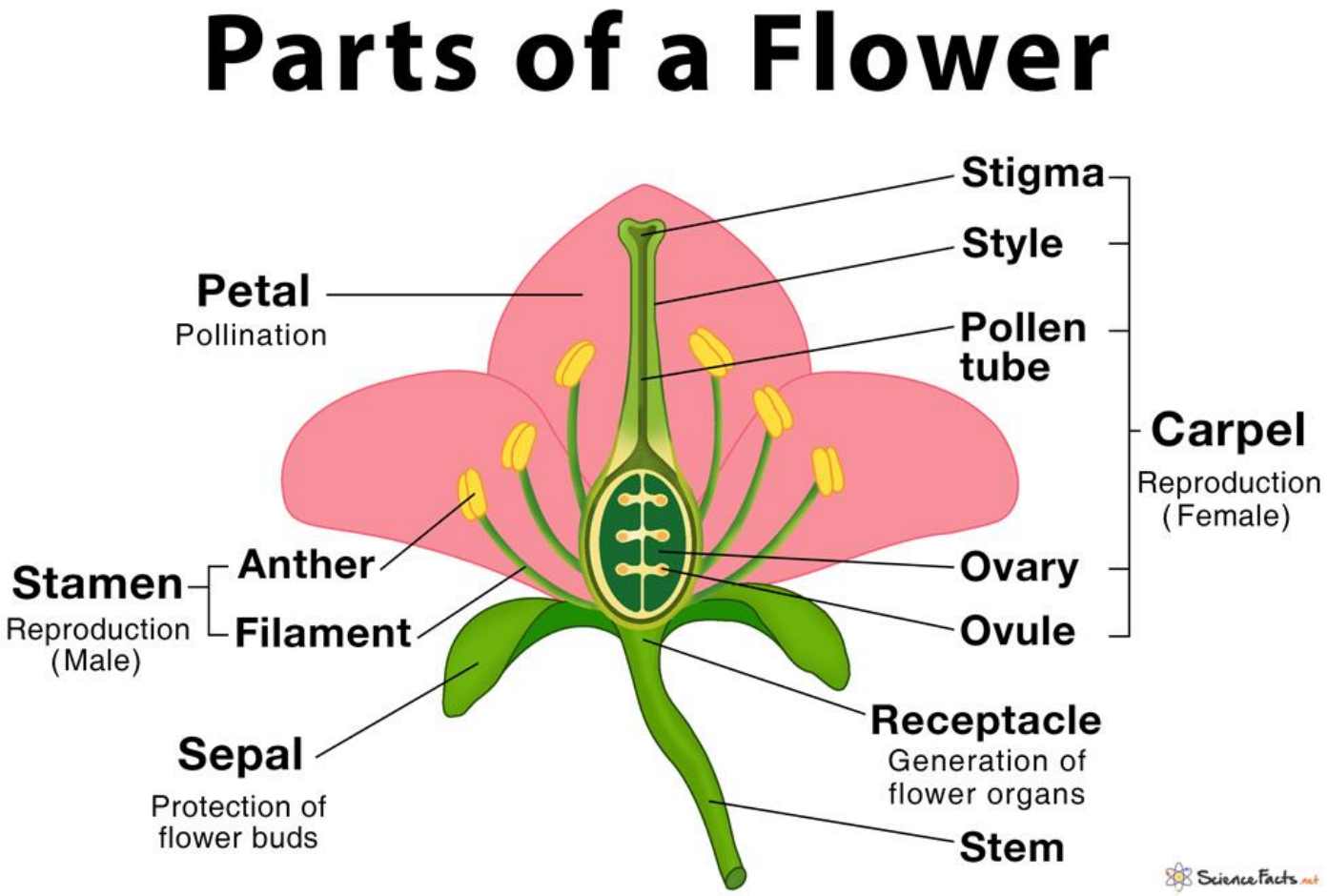
The Problem: Pollinators



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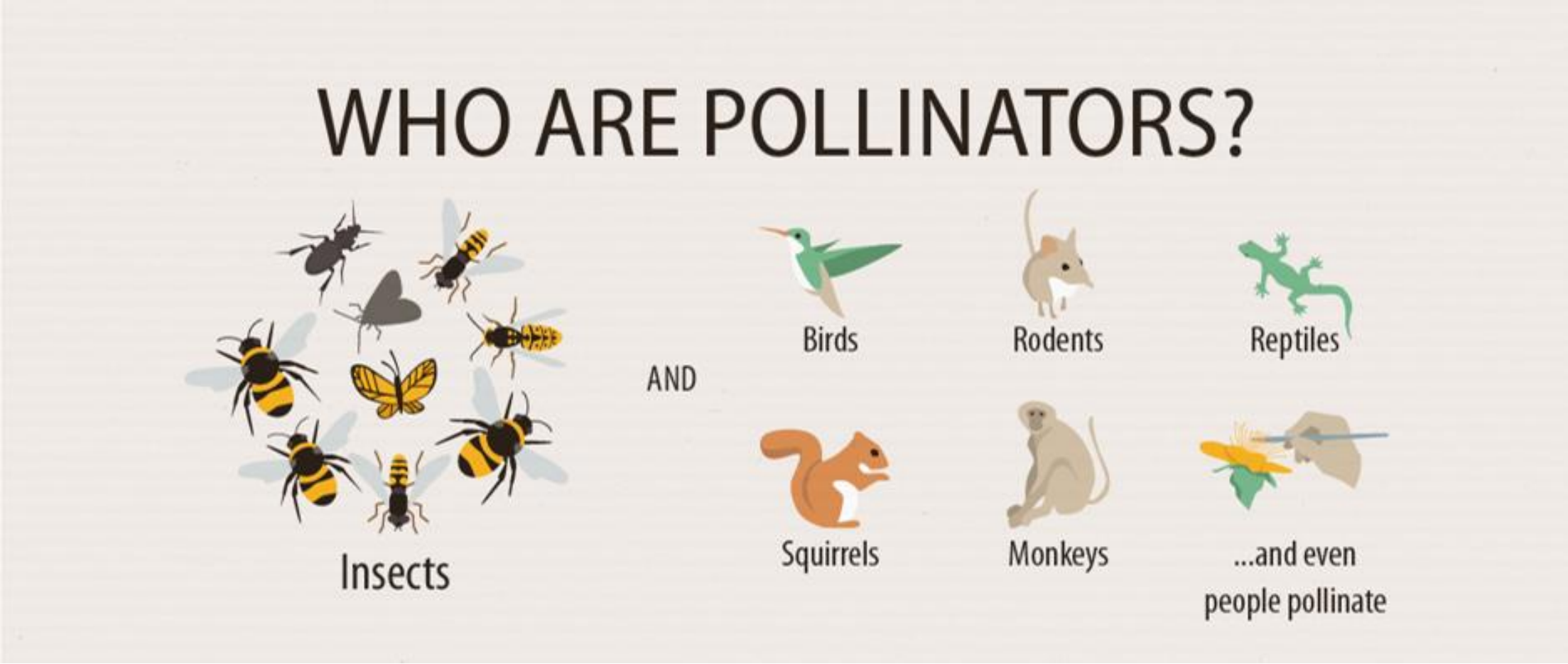
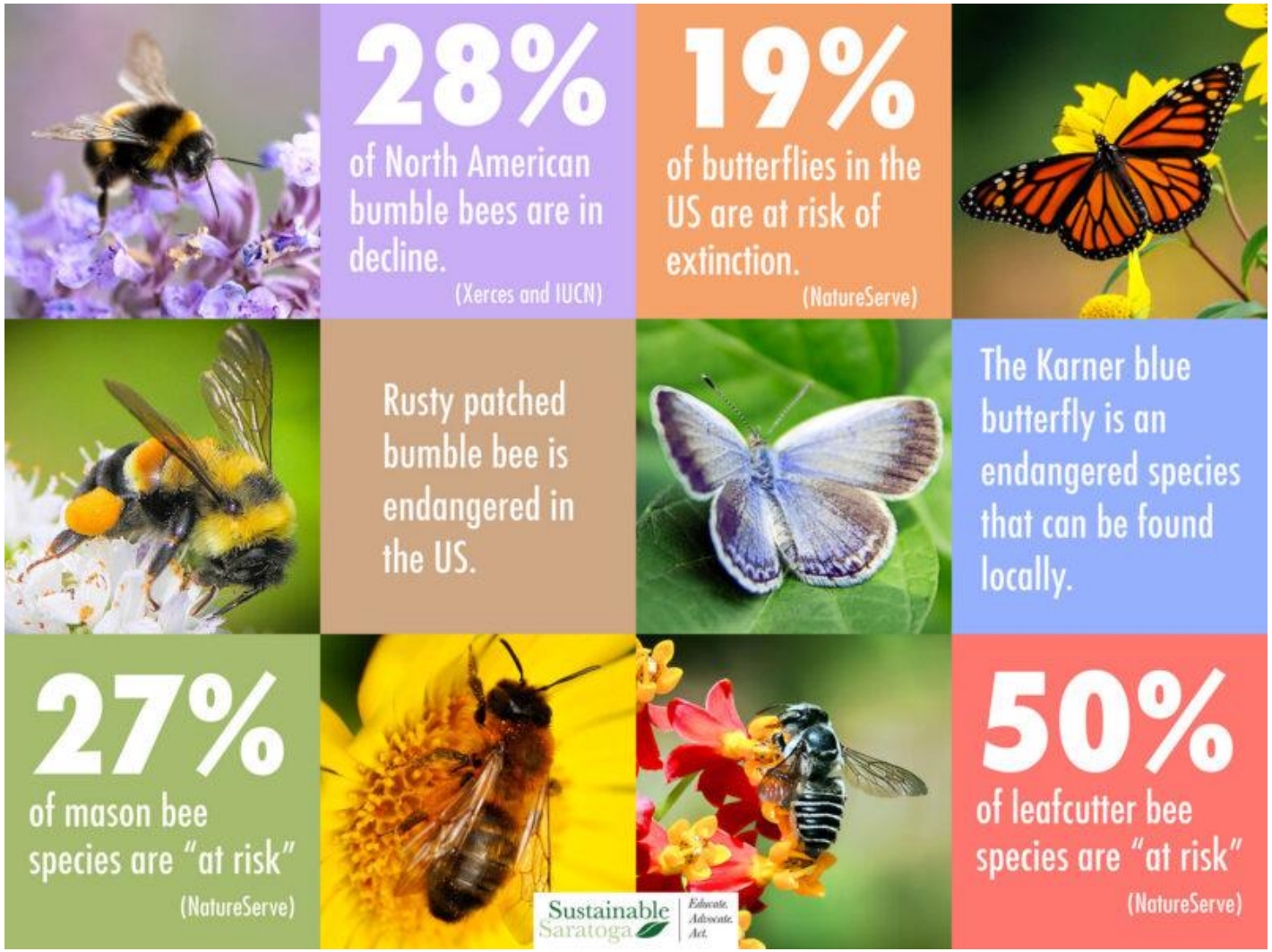
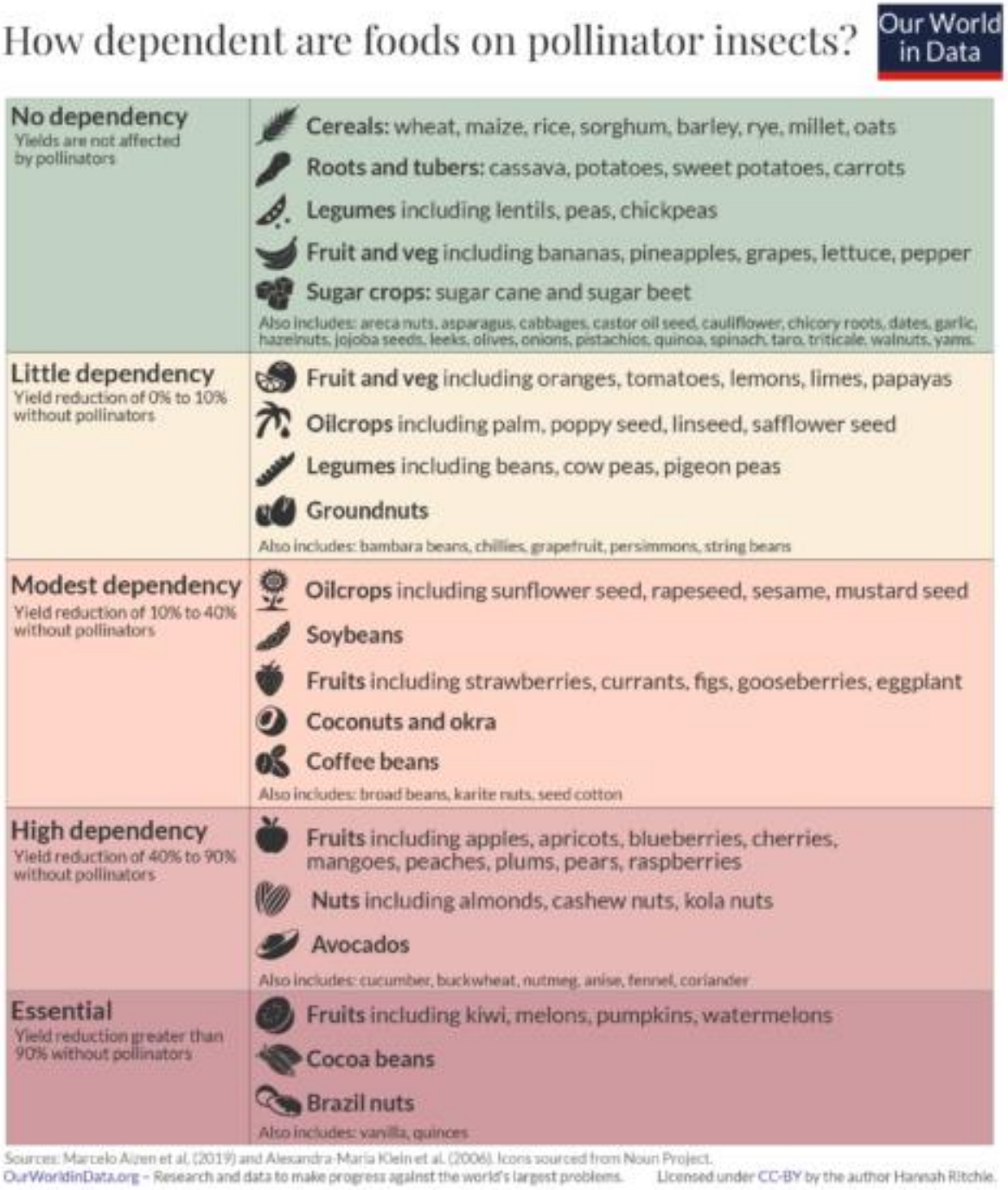



350,000
Pollinator Species Worldwide


28%
of North American bumble bees are in decline.
(Xerces and IUCN)
19%
of butterflies in the US are at risk of extinction.
(NatureServe)
Rusty patched bumble bee is endangered in the US.
The Karner blue butterfly is an endangered species that can be found locally.
27%
of mason bee species are "at risk"
(NatureServe)
50%
of leafcutter bee species are "at risk"
(NatureServe)
Sustainable Saratoga
Educate. Advocate. Act.

The Problem: Pollinators



Data Methods

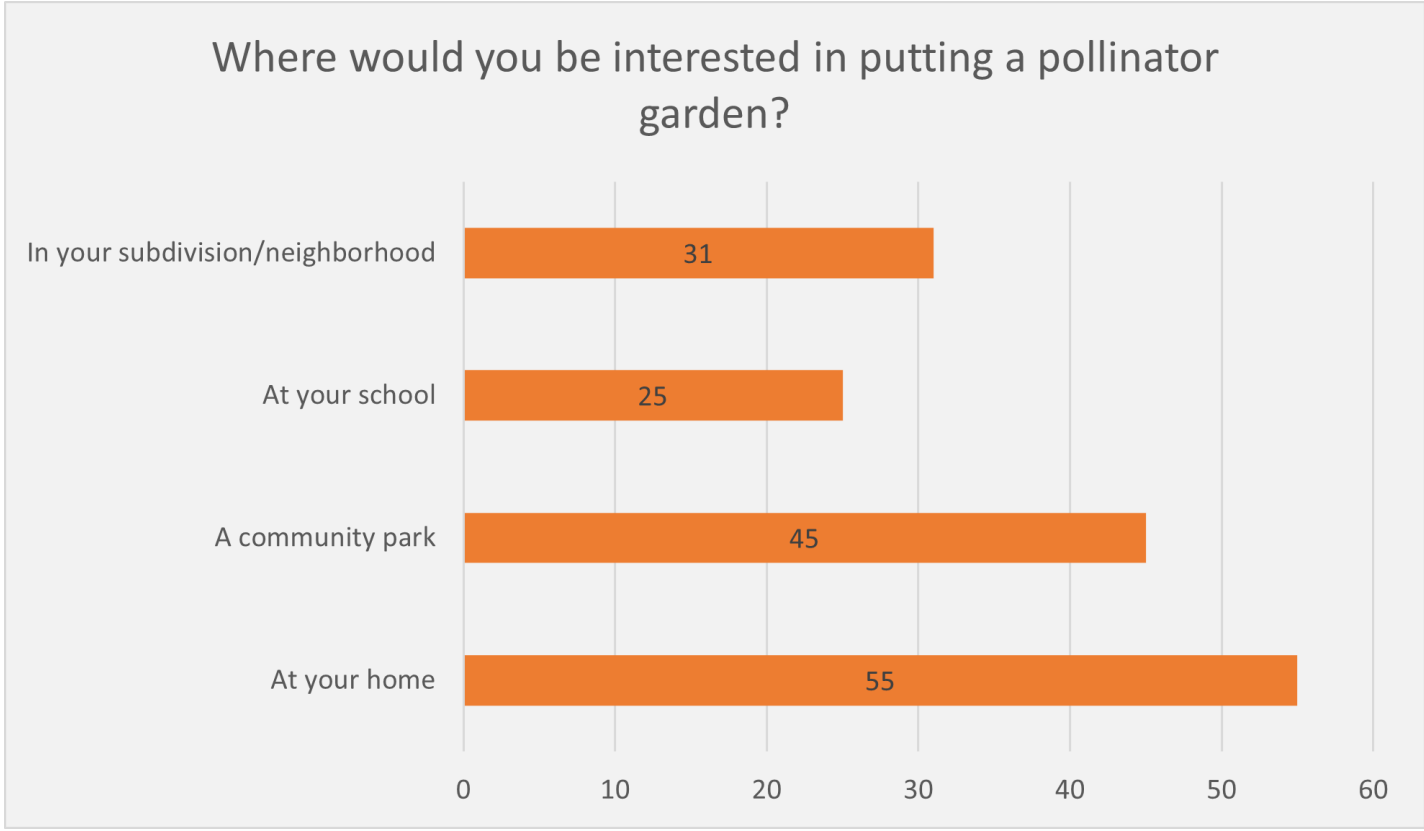
archival research

interviews

literature reviews

surveys.

Survey Results



Interviews

- Hobbyist beekeepers
- Hive Noon LLC

Results: Why focus on gardens?

- Low maintenance
- Low cost

Who is involved

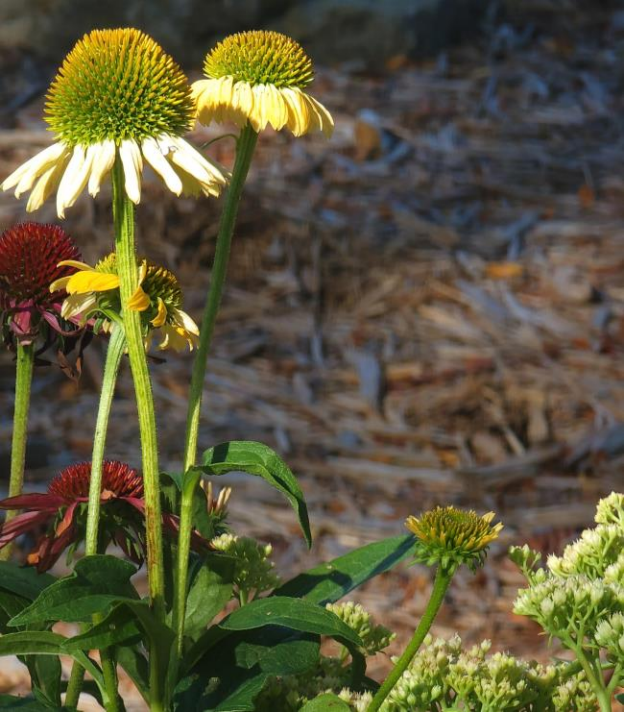
- Metro parks
- Community institutions: UCBA
- Individuals

Public Parks: Voice of America and Keehner

- Action:
  - Establish more native flora
- Future Outcome:
  - Increased biodiversity

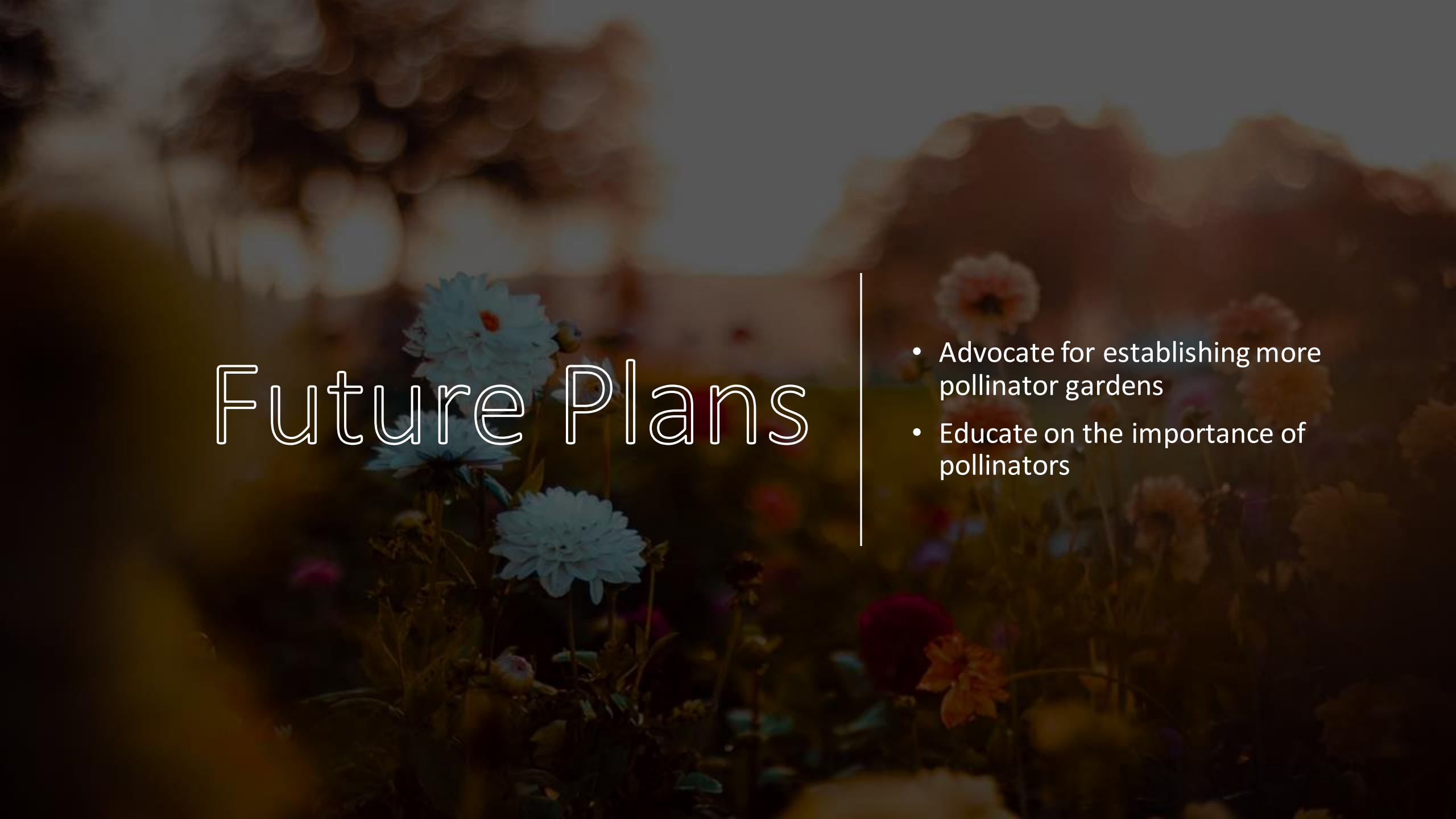
Community Institutions: UCBA

- Action:
  - Re-establish the UCBA Sustainability Club
- Outcome:
  - Sustainable practices



Individuals

- Action:
  - Establishing native flora
  - Sustainable practices
- Outcome:
  - Increased biodiversity
  - Challenged to think outside of the box



Future Plans

- Advocate for establishing more pollinator gardens
- Educate on the importance of pollinators

Thank You

Research Report: Cincinnati Pollinator Gardens and Agricultural Effects Final

Chase E Holden

University of Cincinnati

Abstract

For this community research project, I have chosen to learn more about and design a way to help bees and pollinators. The fast-paced urbanization that has taken place in the last seventeen years has taken a toll on these species as they are losing their food sources and habitats, causing their populations to rapidly decline.

The decline in pollinator species poses a threat to today's agricultural society. In the United States alone, there are at least one hundred crops that rely on bees and pollinators. Without these species, hundreds of crops will not be able to be pollinated, resulting in a loss of food for the general population, as well as a decrease in livestock populations. Therefore, finding a solution is becoming evidently crucial for society.

In order to create a project around this idea, gaining access to and completing research on the local community of gardeners is necessary, as they would be the main target audience. While there are farmers in this area, this is not a common occurrence in the urban city, however, there are plenty of gardeners who rely on pollinators for their small-scale vegetable and flower patches. After learning more about this discourse community, conducting a survey, and interviewing multiple members, I was able to find a solution that almost everyone can contribute to.

Pollinator gardens can be a low-maintenance, low-cost solution to begin helping bee and pollinator species. Not only will these gardens reintroduce safe habitats and food for the pollinators, but also increase native flora in the area.

Within society, there is a reliance upon set agricultural procedures and processes to continue smoothly. For these to continue, however, there are many different species on which they rely. For example, over one hundred crops in the United States rely on bees and pollinators, but due to the increasing threats to their populations, agriculture is facing a looming crisis.

As bees and other pollinator species lose access to their food and habitats, their populations are rapidly decreasing. Without these species, hundreds of crops will not be able to be pollinated, resulting in a loss of food in grocery stores, as well as a decrease in livestock populations. Therefore, finding a solution is crucial to society.

In order to complete this project within the local area, finding a discourse community is key. Due to the fact that Cincinnati, Ohio is not necessarily a large farming and agricultural area, the gardening community was the next best target audience for this project. Using social media like Facebook, I was able to find several different Cincinnati and West Chester gardening groups, some even focusing directly on native pollinator plants. By choosing a few of these Facebook groups, I was able to research these discourse communities and discover more about the project overall.

Continuing with the project first depends on how these groups and the discourse community of Cincinnati gardeners fit into John Swales' model of a discourse community. According to John Swales' reflection, there are six qualities that decide a discourse community; to quote him, these qualities are:

- "A discourse community has a broadly agreed set of common public goals"
    - Within these local gardening groups, most if not all participants held the same common goal of improving the local environment while increasing access to fresh fruits and vegetables. This, of course, is a broad overview of this community, as there are several subgroups and smaller goals that are not as widely shared throughout.
- "A discourse community has mechanisms of intercommunication among its members"
    - While conducting a deep dive into this community, several different groups and forums were found. Topics within these groups ranged from

large-picture ideas to small questions that new or inexperienced members asked. These different methods of talking, participating, and creating forums are perfect examples of intercommunication mechanisms.

- "A discourse community uses its participatory mechanisms to provide information and feedback"
    - There is an ever-growing wealth of informational texts within forums and easily accessible places online where one is able to seek help. The Facebook groups that I joined in order to research pollinator gardens and the general discourse community involved had hundreds to thousands of people involved that created a safe environment for sharing information, asking questions, as well as providing helpful feedback to one another.
- "A discourse community utilizes and possesses one or more genres in the communicative furtherance of its aims"
    - There are several different "genres" within the gardening community. A better word to describe this would be "subgroups". Examples of these subgroups include home gardening, native wild flora, community gardens/parks, etcetera. Within each of these subgroups, there are more well-defined common goals and specific information provided.
- "A discourse community has acquired some specific lexis"
    - The gardening community contains large amounts of garden-specific jargon, including terms such as bolting, chlorosis, NPK, and so on.
- "A discourse community has a threshold level of members with a suitable degree of relevant content and discoursal expertise"
    - As with any other community, there are different levels of knowledgeable members. Within the gardening community, some of these knowledgeable members influence others by publishing their own research, while some help others by sharing their own experiences that they have developed over years of practice.

Applying this methodology and qualities to these groups confirms that Cincinnati gardeners could be described as a discourse community. For instance, there are multiple different forms of communication and texts that one could join within the forums, as well as the informational texts available to read, which contain garden-specific jargon, guides with pictures, and individual ideas. One could confidently claim that these gardening groups do contain large numbers of individuals that share the same common goal and values.

Literature Review

As this is a community-based project, confirming that the Cincinnati gardening groups are in fact a discourse community allows for this project to continue. The next valuable step in deciding upon the validity of establishing local pollinator gardens to help increase the native pollinator species would be to study previous research done on this topic. As environmentalism has been increasing over the past few years, there was an abundance of material to sift through. Several articles and publications helped me decide on this semester's project, however, the ones that were my biggest focus are mentioned below.

Ania A. Majewska and Sonia Altizer's article, "Planting gardens to support insect pollinators" talks about how global insect pollinator declines have helped prompt habitat restoration efforts. This includes the establishment of pollinator gardens, which can provide food, housing, and nesting areas for pollinator species, "Our results indicated that pollinators responded positively to high plant species diversity, woody vegetation, garden size, and sun exposure and negatively to the separation of garden habitats from natural sites" (Majewska et al). Implementing pollinator gardens in a variety of locations proved to increase the number of local pollinators as long as the garden was near a natural site. Majewska and Altizer both attended the Odum School of Ecology at the University of Georgia where they got their degrees in conservation biology. After graduating, they now work at the Center for the Ecology of Infectious Disease at the University of Georgia where they run research studies. Through conducting this study, they have made an effort to re-establish native insect pollinator populations by experimenting with different garden and habitat layouts. They found that large, natural sites with diverse native flora and untouched woody vegetation attracted the most insect pollinator species. This research provides a great baseline for any project wishing to help pollinator species.

Another article that focuses on pollinator specie activity within an urban garden is Fukase and Simons' scientific article, "Increased Pollinator Activity in Urban Gardens with More Native Flora". Fukase, J. and Simons, A.M. graduated from the Institute of Environmental Science, Carleton University, and the Department of Biology, Carleton University respectively. This research brings into view how urbanization has drastically decreased pollinator populations throughout the cities. In an attempt to research the effects of urban pollinator gardens, they

initiated their own urban gardens with pollinator-friendly native plants. Throughout the study, they observed and recorded that pollinator activity did increase with the gardens containing large sections of native foliage. Fukase and Simons wrote, “Almost 90% of flowering plants rely on animal pollinators for reproduction, and negative effects of pollinator declines on crop production have been shown. Urbanization is at least partially responsible for pollinator declines, and public programs have been developed to encourage pollinator-friendly gardens” (Fukase,J. et al.). Through urbanization and human interactions, pollinator species have been facing population declines, however, this has led to more gardeners establishing pollinator gardens. This research study and the results given are very similar to Majewska and Altizer’s study above. With both groups focusing on the native flora within an urban environment to increase pollinator populations, as well as the similarities within their results, there is more confidence to claim that pollinator gardens within an urban environment can increase pollinator diversity within the right conditions.

An important scientific article for research on pollinator population impacts is “Insect Pollinated Crops, Insect Pollinators and US Agriculture: Trend Analysis of Aggregate Data for the Period 1992-2009” written by Nicholas W. Calderone, who graduated from the Department of Entomology, Cornell University. Comparing trends in US agriculture between the years 1992 till 2009, Calderone discovered that crop and food production has suffered from the rapid decrease in pollinator populations, causing millions of acres and dollars to be lost in total. Calderone writes, “Pollination can result from the action of abiotic forces such as wind and water, but 80% of the Angiosperms rely on animals, including bats, flies, butterflies, beetles, and other insects” (Calderone). Pollination can happen by a variety of forces. While this specific quote may not be the most important one throughout Calderone’s paper, this is a good summary of what pollination is. This will be an important paper for this research study, as there are many important figures and study points conducted throughout the seventeen years. Pollination is an essential step in the reproductive process of approximately 300,000 species of flowering plants worldwide, as it is normally required for seed production. Plants with incompletely pollinated flowers produce fewer seeds and less genetic diversity. Threats to native pollinator populations include agricultural intensification, habitat modification, alien pathogens, loss of genetic diversity, pesticides, etc. Man-managed honeybee populations are growing worldwide; however,

this rate of growth is not keeping up with the faster-paced need for pollinator-dependent crop production.

Katherine CR Baldock, Biological Sciences alumni at the University of Bristol and Cabot Institute, is a prominent researcher for species conservation. Some of her main work focuses on how urbanization, pesticides, and human interactions are affecting the environment and the local species. Baldock's research paper, "Opportunities and threats for pollinator conservation in global towns and cities" focuses on ways to conserve pollinator species. With the increasing threats to pollinators due to climate change, urbanization, pesticides, and pollution, researchers are trying to find the best ways to increase pollinator populations. Baldock writes, "Keeping honeybees in urban areas is increasing in popularity. There is a general belief that increasing the numbers of honeybee hives will help pollinators; however, this is unlikely to benefit wild pollinators, and increasing honeybee numbers may even exacerbate problems for wild pollinators through competition for food resources" (Baldock). While the introduction of honeybee hives has proven to have a negative effect on the other pollinator species, increasing pollinator flowers and nesting sites, as well as reducing grass mowing will benefit pollinator populations. Urbanization has negative effects on the populations of various animal species, such as the reduction in the number of flowers visited and the loss of rare species. However, recent studies have shown that certain groups of bees, such as the ones that are commonly found in urban areas, perform well in these conditions. This research paper can help lead people away from keeping beehives to increase local pollinator populations, instead establishing ways to increase the native pollinator populations that are already established locally.

Kevin C. Matterson and Gail A. Langellotto's research study, "Determinates of inner-city butterfly and bee species richness" establish pollinator gardens in multiple places throughout New York, creating various conditions. Matterson and Langellotto both attended the Department of Biological Sciences at Fordham University, later conducting research for this institute as well. In the article, Matterson and Langellotto write, "While both bees and butterflies responded to sunlight and floral area, bees responded to several additional garden variables. Specifically, there was marginal support for a model of bee species richness including garden canopy cover, and bee species richness also responded positively to the total garden area and the presence of

wild/unmanaged areas in the garden" (Matterson et al). During the research study, Matterson and Langellotto focused on butterfly and bee species being affected by the newly established gardens. By observing these species, they noticed differences in the length of time spent around the flowers and food sources and the use of unmanaged areas to create nests. Because bees are central place foragers, meaning that they nest within or near gardens, as well as their preferred spot of wild/unmanaged areas within a garden, this suggests that rooftops and other "open' urban habitats might allow for an increase in local pollinator diversity.

Methods

After conducting research through the Cincinnati gardening-specific Facebook groups, as well as the literature reviewed in the earlier section, the next step in the project was to design a survey that would gather the views, opinions, and advice of various people within the local area. While surveying people within the specific discourse community, including the different subgroups of small-scale vegetable gardeners, floral gardeners, beekeepers, etc., I also wanted to get survey answers from the general population in my area. Luckily, social media platforms, such as Facebook and Instagram, gave me the advantage to reach more of my fellow gardeners. I also used parks to my advantage, surveying people who were just walking around. These methods gave me a good diverse variety of results, from avid gardeners to people who do not have a green thumb and like to just visit, rather than care for gardens. Overall, I was able to receive ninety-one surveys, gaining an overwhelming amount of information to continue the process. The questions developed contained multiple different styles for answering, including multiple-choice, short answer, linear scale, etc. The questions and layout can be seen in Figure 1. The survey questions are as follows:

- Do you consider yourself a gardener?
- Are you concerned about declining bee and other pollinator populations?
- Would you be interested in starting a low-maintenance pollinator garden?
- Would you be interested in learning more about native pollinating plants for Ohio?
- Are you interested in participating in a community gardening project to create small pollinator gardens?

- Where would you be interested in putting a pollinator garden?
- What kind of information would help you in developing your own pollinator garden?

After analyzing and condensing the results of the surveys, I was able to piece together more specific questions to ask an expert in the field during an interview. The questions for the interview are as follows:

- As a beekeeper, have you invested in developing your own pollinator garden? If so, have you noticed any differences that this has created? (Such as more productivity within the hive, more local bees or pollinators visiting your land, etc.) If you have not developed one, what has been the barrier? (Money/materials, general information gap, overwhelmed, time, etc.)

- Have you created a pollinator garden in a business environment or community space? If so, how did you go about doing so? Was it met with local government/community resistance?

- What was one of the most beginner-friendly information sites/locations that you dealt with that you would recommend to others just beginning their journey?

- As the goal is to create native pollinator gardens in the Ohio area, do you know of any local places that sell true native plants? (Either in seed form or an already propagated plant)

- What led you to become interested in beekeeping? What sources helped you learn and gain valuable information at that time?

- Feel free to mention anything else that would give more insight on this topic, or things that you have found interesting that you would like to share!

Upon developing these questions, I scheduled two different interviews. The amount of information gathered from these interviews worried me, so I decided to talk with multiple beekeepers, one being a hobbyist and the other doing it professionally for ten-plus years. The hobbyists are a married couple, Paul and Ellen Bowmann, who were business owners and a

teacher respectively, beekeeping during the weekends at their private property. I was lucky enough to already know this couple, as they are a long-time family friend. My next interviewee, Chris Alvarado, was someone whom I had found and developed a conversation with within one of the many Cincinnati gardening groups when I proposed my community project idea to the rest of the group members. After our second interaction, I proposed the idea of conducting an interview with him on pollinators and the importance of establishing safer areas for these species. Alvarado created his own beekeeping company, Hive Noon LLC, providing educational courses, landscaping work, as well as beekeeping essentials to his clients. As beekeeping, pollinators, and pollinator gardens all go hand in hand, I thought that it would be an important role for these interviews to continue the project.

Results

Upon receiving ninety-one survey results, there was a lot of information to sift through and analyze. I was pleasantly surprised at how many people were in favor of pollinator gardens, or that they had already started one in the local area. This was represented in Figure 4.

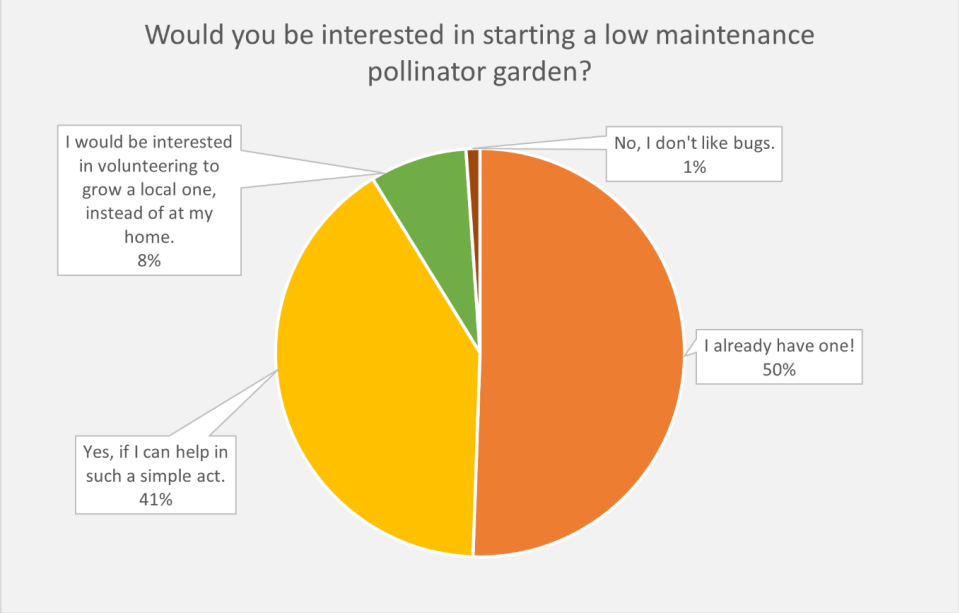


Figure 1. Would you be interested in starting a low-maintenance pollinator garden? Survey results.

Another surprising result was how many people surveyed within the community considered themselves gardeners, as seen in Figure 2.

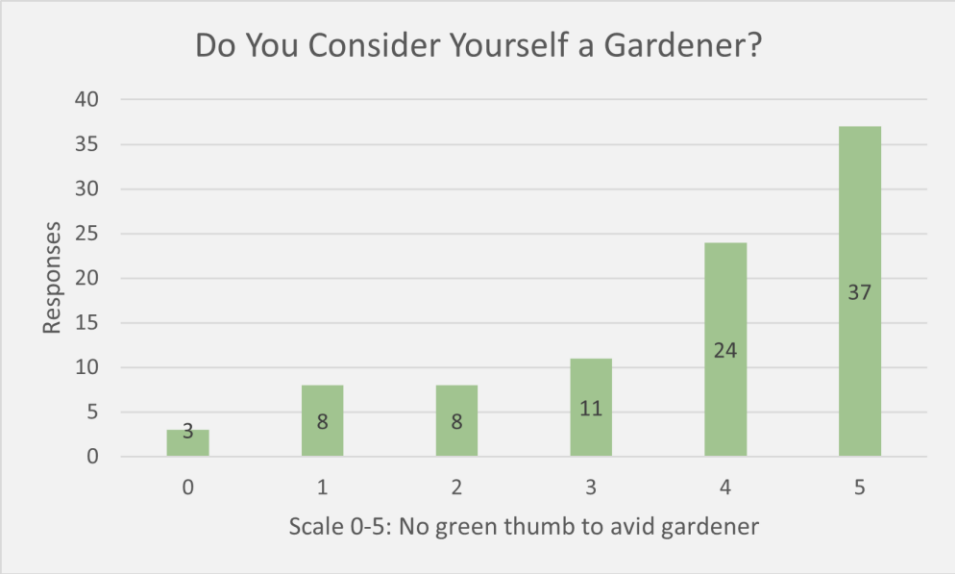


Figure 2. Do you consider yourself a gardener? Survey results.

More than half of the people interviewed claimed they were at least good or avid gardeners. Figure 3 and Figure 5 both show that the surveyed population showed interest in the declining pollinator populations and learning more about the native Ohio pollinator plants.

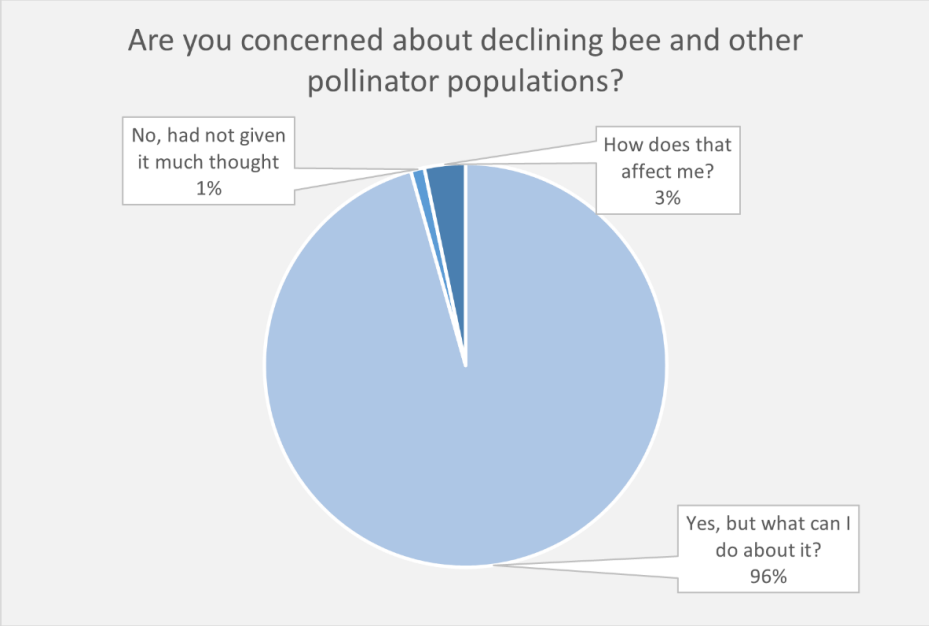


Figure 3. Are you concerned about declining bee and other pollinator populations? Survey results.

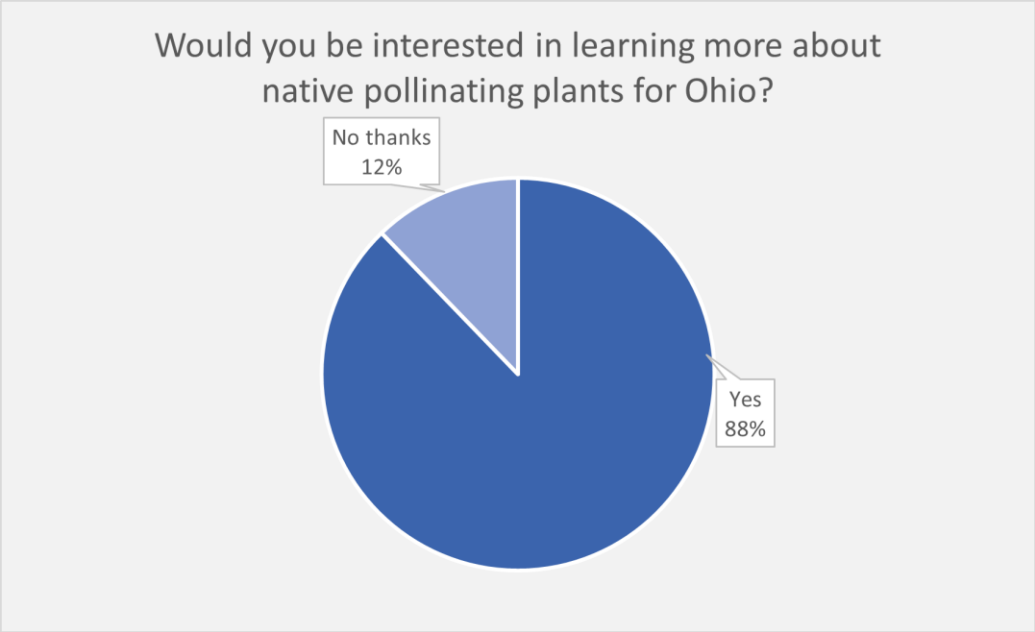


Figure 5. Would you be interested in learning more about native pollinator plants for Ohio? Survey Results.

Finally Figure 6 and Figure 7 focus on whether the interviewed community showed interest in developing a pollinator garden that they could participate in, as well as where they would be interested in seeing the garden set up. These results led to more well-defined questions that would be answered during the interviews.

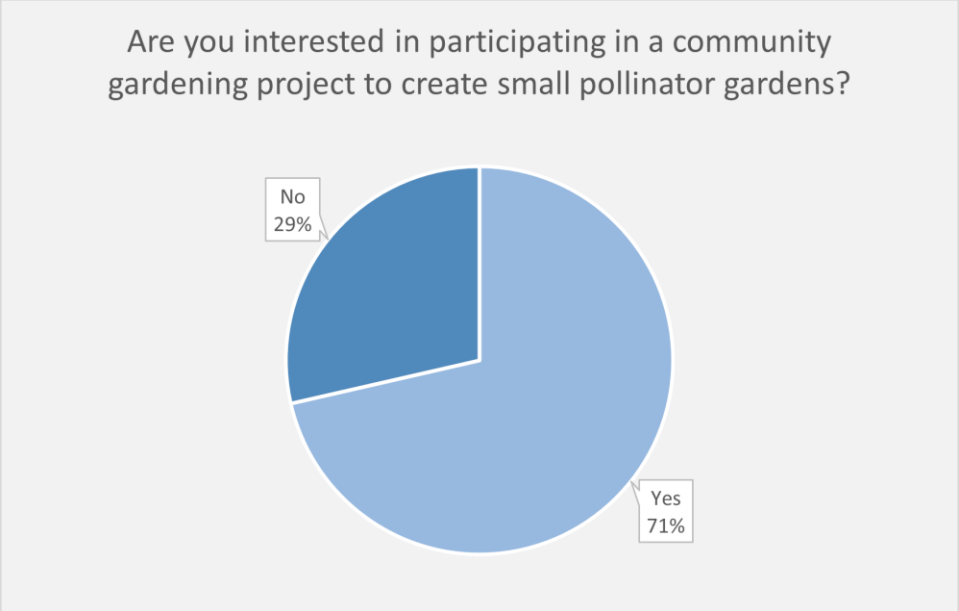


Figure 6. Are you interested in participating in a community gardening project to create small pollinator gardens?

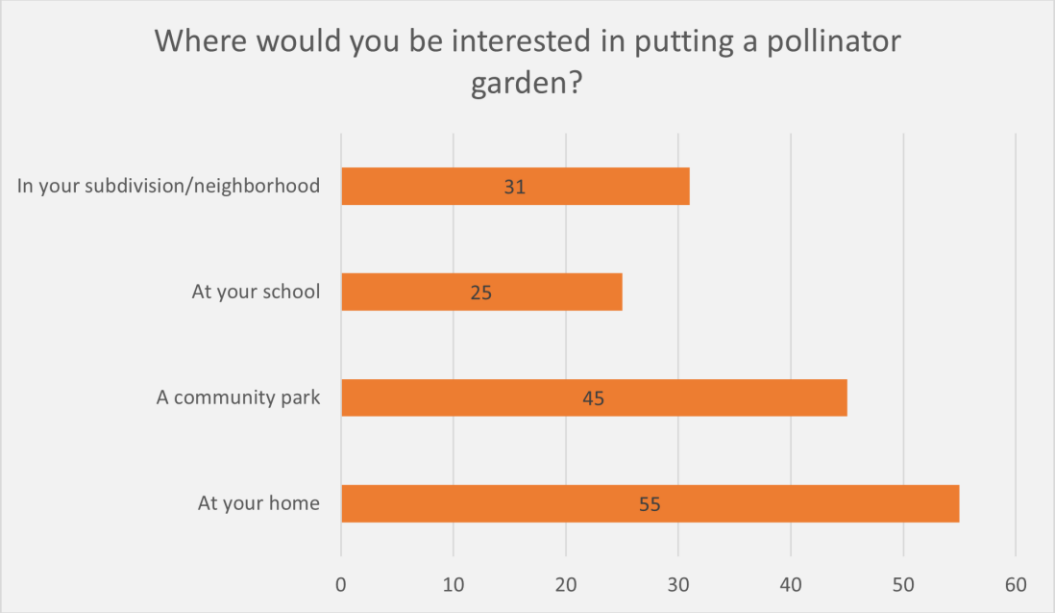


Figure 7. Where would you be interested in putting a pollinator garden? Survey results.

As everyone interviewed was already beekeeping, I was able to keep the same questions throughout. I think that this method gave me more information because there were two very different views and experiences shared. The questions were developed after viewing the results of my survey and reading what people would like or need to know to begin their own pollinator garden.

Paul and Ellen had limited time, making it difficult to get a gist of their experiences with this topic. That being said, the answers received were very short and concise. I was happy to hear that they did have a small pollinator garden available for their bees with what little space they were able to reserve, however, because of its size, they were not able to see a difference in honey production or attraction of more pollinators to the area. They were also interested in the idea of creating a community pollinator garden but did not have any experience with doing so. I think one of the most interesting parts of their interview was how passionate they were about the subject. When answering my last question, Paul took over and talked about the natural rewards this hobby has given him, “My interest has always been there, having a natural product and

contributing to nature's key pollinators. I felt like it was a good investment of time and effort plus a nice reward for the effort" (Paul Bowmann). Paul's passion for beekeeping and gaining raw local honey from his own yard is an amazing way to relate to nature and have a mutualistic symbiosis with pollinators.

Chris Alvarado was able to talk a little longer than the Bowmanns', which allowed me to get some more information on the topics. He had an interesting story about how he got into beekeeping and creating pollinator gardens, "I took a landscaping job and the people ended up being teachers for Ohio State's beekeeping program. I showed interest on the 2nd day. They hired me for their bee business and taught me for years. They also sent me to the University of Florida for beekeeping. After that, I started Hive Noon to help others get into beekeeping" (Alvarado). While this quote is not the most important thing we talked about, I thought that it was fascinating how he got into beekeeping. Obviously, as a beekeeping educator, Alvarado has a large space set aside for his beehives. He mentioned that the beehives are located out in the countryside, which has a large abundance of food sources, as well as large pollinator gardens that he scattered throughout the landscaping. Because of the abundance of food, more native bees can be found throughout the property, but there is not much difference reported in the hives. Being an educator, he gave lots of great advice for those wanting to get into either beekeeping or pollinator gardens, "For clients with challenges to do any sort of gardening, I always recommend stopping mowing the last few passes in their lawn. Whether it be along the property line or the very back of the yard. Just to let wildflowers grow or I supply them with a bag of native wildflower seed to spread out there" (Alvarado). Not everyone has a green thumb, so these helpful tips are good for people with limited time and/or space. At the end of our interview, Alvarado provided me with several different articles and useful websites that would help me advance in my community project. One of these links provided a very descriptive informational graphic, giving a perfect option for pollinator gardens. This image and the information that it provides can be seen in Figure 8 down below.

Both interviews gave a good foundation for the upcoming steps in the community project. With a lot more resources to look through, Alvarado and the Bowmann's both shared some great websites for learning about the different topics and where to get true native plants for Ohio.

Discussion

For my project working with pollinator gardens, I planned on establishing a small personal one as an example of how simple the layout could be. From there I wished to communicate with members of my community to potentially establish a large-scale public pollinator-friendly garden. The spread of general information is also a key factor in this project because not a lot of people know about the importance of pollinators to society and agriculture procedures.

The creation of my personal small-scale pollinator garden began earlier this semester in August. Since the beginning of this garden, there have been native pollinator species visiting daily. Pollinators such as bees, small insects, butterflies, and a caterpillar in the middle of cocooning were seen within this garden. In the next coming years, I wish to take care of my old overgrown garden, renovating it to become a native pollinator garden area that can remain untouched by the general public to keep their homes and nesting sites safe. This progress can be seen in Figures 9, 10, and 11 below.

Overall, this project went smoothly. It became something way bigger than I imagined it would be, as I have influenced at least six individuals to establish their own pollinator gardens and have been in contact with the Voice of America Metroparks to include the pollinator-friendly plants into their landscaping. Since the weather is getting colder as we head into the fall and winter months, I knew that implementing gardens could be a difficult topic to sell people on. However, I was very pleased to learn that VOA parks would include me in their discussions involving landscape plans for the upcoming year. I was also in contact with Keehner park in West Chester township to create a small pollinator garden area, but communication with all of the landscaping crew has been slow and sometimes nonexistent.

Finally, another thing that has occurred due to this project has been the talk of re-establishing the University of Cincinnati Blue Ash Sustainability Club. As this is a new development, I do not have a lot of information to report, but a meeting was just held on November 10th to further discuss what needs to be done in order to fully establish this club.

Reflection

This project took me by surprise. Not expecting the requirement to be a community project, I originally believed that it would have something to do with our major of choice. However, seeing how far I have come and managed to succeed in such a small manner of time has really shown me what I am capable of and how much I am able to grow in such a short duration.

I want to take this project even further and continue working on it to complete my second honors experience, but also to see how many people and businesses I can get involved. My sister, who was just recently in Chicago, has been supporting me throughout this entire process and has been there when I need to bounce ideas around. So, while she was in Chicago, she actually went on a city tour that focused on green cityscapes. Seeing some of the different urban landscapes that include green spaces in their designs inspired me to go even further and focus not only on in-ground or raised platform pollinator gardens but also to think about the sustainability factor of it all. I want to be able to influence local businesses and citizens to include a green environment, that may or may not provide for pollinators somewhere on their building even if it is growing up the side or on the rooftop. I believe that with this course of action, we can experience a more green, sustainable, and healthy environment.

I believe that by re-establishing the sustainability club and the University of Cincinnati Blue Ash, Kiarie, my fellow classmate, and I can help influence a wider group of people to become more conscious about what is happening around us and to become greener overall. These are just some very small steps in a small local area to fix issues within the climate and sustainability of everything, but I believe that more people are becoming aware of what is happening around them and following suit.

Community Implementation

I continued to develop this project in three contexts: personal, institutional land, and public parks. In addition, I researched more in-depth and practiced various sustainable practices, including composting and hydroponics. Overall, I believe that this was a very successful addition to my original project.

For my personal at-home pollinator garden, I continued my trial pollinator garden, started a small hydroponics herb garden, and began composting. As we were at the mercy of the

weather, growing anything outside was close to impossible, so I broadened my research and purchased a small hydroponics counter system. It was with this system that I began my indoor herb garden, containing parsley, cilantro, basil, and mint. As long as liquid nutrients were available, all seedlings continued to grow and yielded a good amount of produce.

Composting can be a good method to reduce personal waste while producing fertilizer for healthier plant growth. Again, due to the cold and rainy weather, the complete breakdown of the composted waste was halted. However, I continued to add equal amounts of greens and browns to slowly build up my bin. As the weather begins to warm up, I should see an increase in the rate of breakdown. Once this occurs, the fertilizer will be a good addition to any garden.

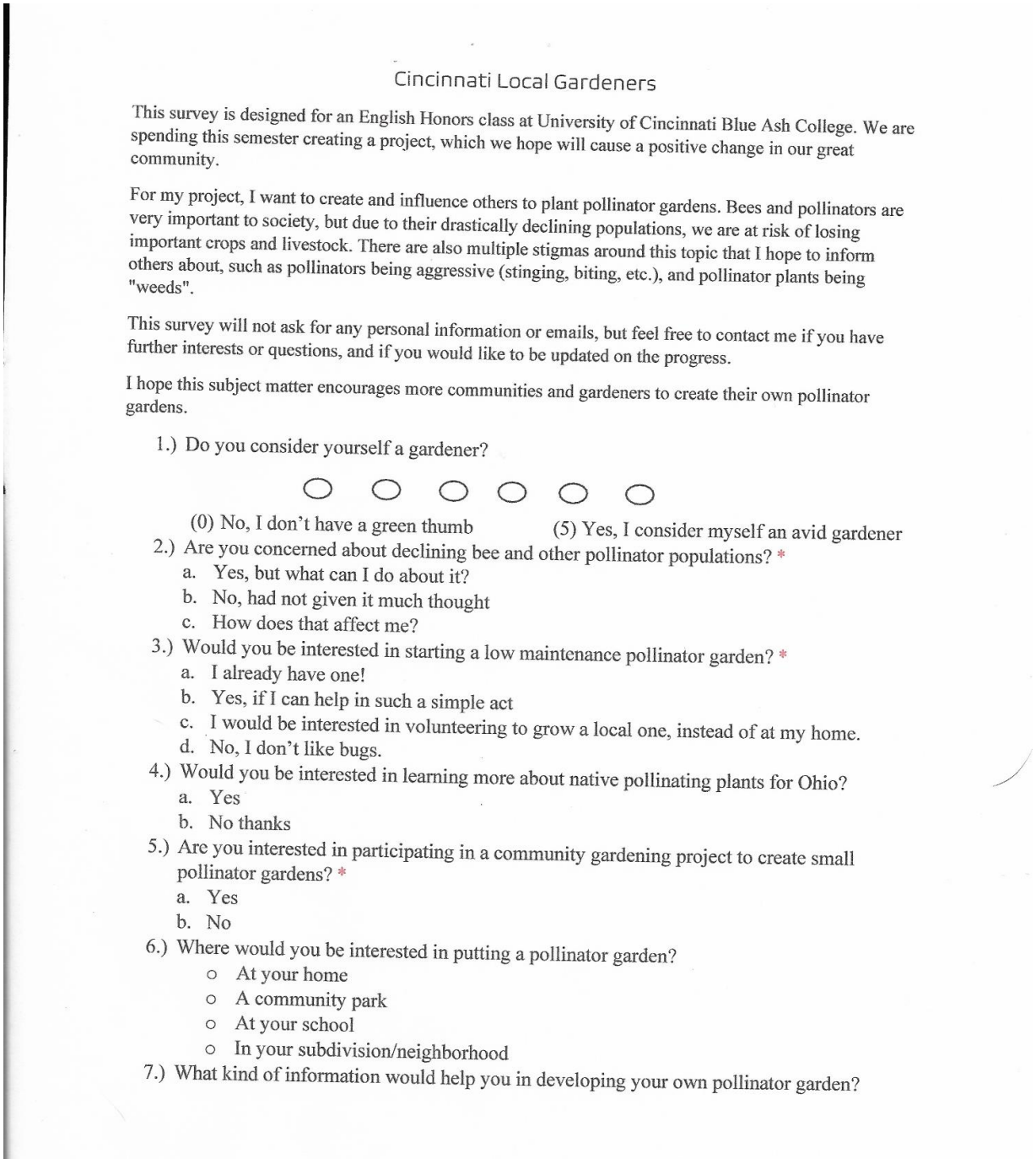
For institutional land, I focused mainly on the University of Cincinnati Blue Ash campus. Professors Dr. Robert Gioielli and Dr. Ruth Benander helped my fellow classmate and I re-establish the UCBA Sustainability Club. This club had made remarkable progress but was sadly put to an end due to the 2020 pandemic lockdown. With the re-establishment of this club, we were in close communication with Professor Dr. Mark Otten, who was in charge of the wildflower patch on campus. When receiving his approval, the club began to work on the maintenance of the wildflower patch, establishing compost bins nearby, as well as educating others on the importance of these practices. As president of this club, I plan on frequently visiting the campus during the summer to water and weed the wildflower patch.

Finally, for the public parks, I continued close communication with the Voice of America Park and Keehner park. Since VOA Metro Park is owned by the state of Ohio, they are required to write up a formal request and budget report for any additional changes to the land. Because of this, it has been a long and difficult road to increase the number of pollinator-safe plants in their natural wildlife area. While this has not occurred yet, it will increase the natural biodiversity and create more food and undisturbed habitats for these species.

Overall, I believe that this project has been a success. I have witnessed an increase in pollinator species in my own yard since establishing a small undisturbed garden area. I have also seen more people, whether they are fellow students, professors, gardeners, or neighbors, become more interested in establishing their own pollinator gardens. My goal with this project was to find a method that could potentially help all pollinator species and the agricultural society when

practiced at a larger scale. While I do believe that this project was a step in the right direction, there is still more that can be done.

Figures



Cincinnati Local Gardeners

This survey is designed for an English Honors class at University of Cincinnati Blue Ash College. We are spending this semester creating a project, which we hope will cause a positive change in our great community.

For my project, I want to create and influence others to plant pollinator gardens. Bees and pollinators are very important to society, but due to their drastically declining populations, we are at risk of losing important crops and livestock. There are also multiple stigmas around this topic that I hope to inform others about, such as pollinators being aggressive (stinging, biting, etc.), and pollinator plants being "weeds".

This survey will not ask for any personal information or emails, but feel free to contact me if you have further interests or questions, and if you would like to be updated on the progress.

I hope this subject matter encourages more communities and gardeners to create their own pollinator gardens.

1.) Do you consider yourself a gardener?

(0) No, I don't have a green thumb (5) Yes, I consider myself an avid gardener

2.) Are you concerned about declining bee and other pollinator populations? *
   a. Yes, but what can I do about it?
   b. No, had not given it much thought
   c. How does that affect me?

3.) Would you be interested in starting a low maintenance pollinator garden? *
   a. I already have one!
   b. Yes, if I can help in such a simple act
   c. I would be interested in volunteering to grow a local one, instead of at my home.
   d. No, I don't like bugs.

4.) Would you be interested in learning more about native pollinating plants for Ohio?
   a. Yes
   b. No thanks

5.) Are you interested in participating in a community gardening project to create small pollinator gardens? *
   a. Yes
   b. No

6.) Where would you be interested in putting a pollinator garden?
   - At your home
   - A community park
   - At your school
   - In your subdivision/neighborhood

7.) What kind of information would help you in developing your own pollinator garden?

Figure 8. Generated list of questions for the public survey. Ninety-one surveys were completed.

Figure 9. Informational graphic drawn by Nancy Seiler and US Forest Service. This image provides great information on a well-thought-out and diverse pollinator garden that would aid these species in many different ways.

Figure 10. A grown-out garden that aids as a safe habitat for native pollinator species. I plan on fixing it up within the next year to provide a better environment for them.

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