Worth a thousand words: The impact of images on the perception of pollinator habitat

By

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Abstract:

The pollinator crisis - a catastrophic decline in domestic and feral pollinator populations across the world - has grown in severity over the last decade, and recent rise in the publicity of pollinator decline has brought it to the forefront of conservation work. The decline in pollinator populations is due to many human and environmental factors – one of the most prominent being the decline in natural pollinator habitat as urban and agricultural areas expand. Designed urban pollinator habitat can fill the need for foraging and shelter, however gaining public support for these ecological spaces can be a difficult endeavor. Pollinator gardens and urban ecological habitats are typically viewed as messy or unattractive to users, and landscape architects and designers are often met with resistance when proposing such landscapes for public spaces.

What visual elements can be used as communication tools by professionals in landscape architecture and ecological design to increase the understanding and appeal of pollinator spaces to the public? This knowledge could provide insight into the ways designers and landscape architects present their work to improve the chances of public approval, and thus implementation. A visual preference survey was implemented and became a vital strategy to find the relationship between key visual elements in images, and the visual appeal and the quality of habitat they communicate. Previous studies in the field of semiotics show that images contain visual elements of language that imply meaning through the use of signs and visual cues. Participants evaluated images showing naturalistic sites during the growing season, and showing subjects like flowers and pollinators, especially up-close images. The survey revealed various levels of understanding of ecological function in different demographics, and a proportional level of appeal.

The relationships revealed from the survey were used to create a set of representation guidelines for landscape architects and designers to use when proposing urban pollinator habitat, and other urban ecological spaces. These tools will help to communicate the functionality and need of these spaces, while portraying their intrinsic beauty and potential for enjoyment. A conceptual design was produced from the literature to illustrate how the guidelines can be used in the context of an urban setting.

WORTH A THOUSAND WORDS:

THE IMPACT OF IMAGES ON THE PERCEPTION OF POLLINATOR HABITAT



SARAH M. JACKMAN | MLA 2018



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Figure 0.01 - Photograph of beetle on milkweed taken on one of the last warm sunny days before autumn set in (Author, 2017).



ABSTRACT

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The pollinator crisis - a catastrophic decline in domestic and feral pollinator populations across the world - has grown in severity over the last decade, and recent rise in the publicity of pollinator decline has brought it to the forefront of conservation work. The decline in pollinator populations is due to many human and environmental factors – one of the most prominent being the decline in natural pollinator habitat as urban and agricultural areas expand. Designed urban pollinator habitat can fill the need for foraging and shelter, however gaining public support for these ecological spaces can be a difficult endeavor. Pollinator gardens and urban ecological habitats are typically viewed as messy or unattractive to users, and landscape architects and designers are often met with resistance when proposing such landscapes for public spaces.

What visual elements can be used as communication tools by professionals in landscape architecture and ecological design to increase the understanding and appeal of pollinator spaces to the public? This knowledge could provide insight into the ways designers and landscape architects present their work to improve the chances of public approval, and thus implementation. A visual preference survey was implemented and became a vital strategy to find the relationship between key visual elements in images, and the visual appeal and the quality of habitat they communicate. Previous studies in the field of semiotics show that images contain visual elements of language that imply meaning through the use of signs and visual cues. Participants evaluated images showing naturalistic sites during the growing season, and showing subjects like flowers and pollinators, especially up-close images. The survey revealed various levels of understanding of ecological function in different demographics, and a proportional level of appeal.

The relationships revealed from the survey were used to create a set of representation guidelines for landscape architects and designers to use when proposing urban pollinator habitat, and other urban ecological spaces. These tools will help to communicate the functionality and need of these spaces, while portraying their intrinsic beauty and potential for enjoyment. A conceptual design was produced from the literature to illustrate how the guidelines can be used in the context of an urban setting.



Figure 1.01 - Painted Lady butterfly on aster flower (Author, 2017).



BACKGROUND

BACKGROUND

Pollinator crisis

Purpose: To find what visual elements can be used as communication tools by professionals in landscape architecture and ecological design to increase the understanding and appeal of pollinator spaces to the public.

Pollinators in the US – especially insect pollinators like bees and butterflies – are experiencing a drastic decline in population at the hands of global climate change, loss of habitat to roads, cities, and agriculture land, and overuse of deadly pesticides ("What is Pollination?," n.d.). The US government is already working on changing policies to prevent overuse of pollinator-harming pesticides, but to save pollinator populations more work needs to be done to increase habitats within urban and agricultural areas (Winfree, Griswold, & Kremen, 2007). Pollinator habitat design is already a major part of urban and ecological design, and is promoted in gardening communities through butterfly gardens, but to the general public pollinator gardens are seen as messy and unsightly (Nassauer, 1995). The biggest hurtle to implementing pollinator habitat in public spaces is getting the approval of the decision-making population – the public (Zupančič Strojan & Juvančič, 2003). Doing this requires both appealing people's perception of beauty and enjoyment, and communicating the purpose of pollinator spaces (Nassauer, 1995). Photography and photorealistic images are a major tool that designers and landscape architects use to communicate the visual qualities of a design to their audience. If designers knew which key features – like the scale, color, season, site, or pollinators depicted – their audience perceives as appealing and communicates the purpose that the habitat serves.

Pollinators – Pollination is the act of transferring pollen grains from the male part of the flower to the female part, allowing the plant to reproduce. This action is key in the production of most fruiting plants, which are a major portion of human food supplies and production materials ("Fact Sheet," 2014; Losey & Vaughan, 2006; Southwick & Southwick, 1992). Pollinators are the animals or insects that perform the act of pollination ("What is Pollination?," n.d.). Insect pollinators – such as bees and butterflies – provide approximately 35% of the pollination services in food production worldwide and provide $9 billion in services to the US economy and nearly $12 billion in Brazil ("Fact Sheet," 2014; Giannini, Cordeiro, Freitas, Saraiva, & Imperatriz-Fonseca, 2015; Southwick & Southwick, 1992).

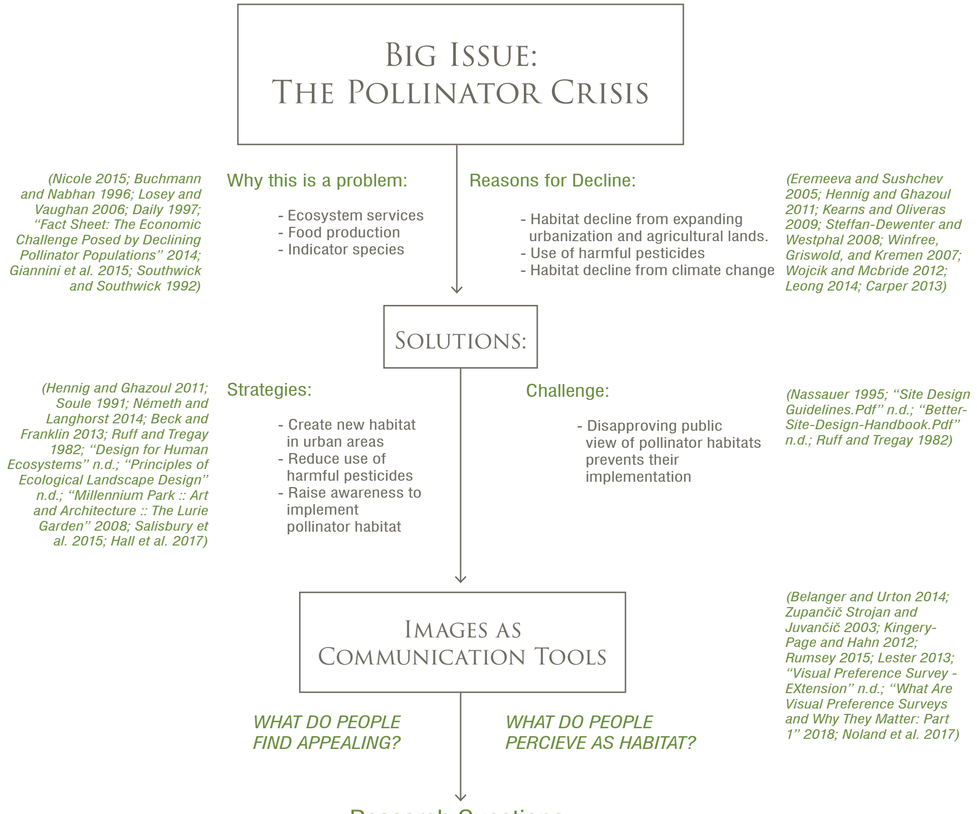


Figure 2.01 - Literature map (Author, 2017).



Figure 2.02 - Feral bumble bee on wild sunflower bloom (Author, 2017).

Pollinator Crisis

Pollinator Crisis – Beginning in the 1970's, the pollinator crisis marked the start of a drastic decline in pollinator species across the US. Other parts of the world – some areas in china, much of Europe, and in Brazil – are experiencing the same decline in their native and domestic insect pollinators (Buchmann & Nabhan, 1996; Southwick & Southwick, 1992). Many sources lay out the factors affecting population decline among bees and other pollinator species; domestic species are most affected by pesticides and the spread of diseases or pests through traveling pollination service companies, while native bee and butterfly species are greatly impacted by the loss of natural habitat through increased urbanization or agricultural expansion (Carol A. Kearns, David W. Inouye, & Waser, 1998). The United State Environmental Protection Agency is taking measures to limit the use of harmful pesticides like neonicotinoids (which compromise the immune systems of insect pollinators) (US EPA, 2013). Much of the remaining issue revolves around the dwindling native habitat for wild bees and butterflies to forage and live in, which can be addressed by building and maintaining more habitat in urban and agricultural areas (Carper, 2013; Eremeeva & Sushchev, 2005; Hennig & Ghazoul, 2011; Mouga et al., 2015; Wojcik, 2009).

Urban Ecological Landscapes and Habitats – Urban foraging habitats are visited just as frequently as native habitat areas, suggesting that urban pollinator habitats are a viable way to increase habitat availability (Carper, 2013; Winfree, Griswold, & Kremen, 2007). It may be difficult to implement these kinds of habitat into public spaces in urban areas because they may be perceived as messy, and their purpose misunderstood because of this (Nassauer, 1995). There is an abundance of opportunity to implement pollinator habitat into the urban matrix: in suburban gardens, along roadways, and on temporarily vacant or reserved land (Németh & Langhorst, 2014; Soule, 1991; Nassauer, 1995). The real issue is creating a "cultural language" (Nassauer, 1995) that communicates both the function of the designed habitat and its intrinsic beauty.

Visual Language - Semiotics

Semiotics - There are a number of different theories of visualization, one of the most prevalent being the Gestalt theory that perception is a result of a combination of sensations and not of individual sensual elements (Lester, 2013). However, in recent years a new theory has evolved based on the study of signs, symbols, and the way they communicate with individuals, called the study of Semiotics. Semiotics is known as the study of signs; in which signs are visual objects that represent a meaning of some sort to the person viewing them. According to semiotics, anything can be a sign so long as it has some meaning attributed to it. Signs can be broken down into three distinct types based on the level of abstraction associated with their meaning: *iconic signs*, *indexical signs*, and *symbols*. *Iconic signs* directly represent the subject they relate to, for example a sign of a stick figure crossing a road directly represents a pedestrian crossing. *Indexical signs* are more interpretive, where the sign has a logical connection to the subject, but does not directly represent it, like a car or airplane represents the notion of travel or exploration. *Symbols* are the most abstract version of signs, and are often not related to their subject logically and must be taught, like the way a flag represents an entire country or a mascot represents an institution. All of these types of signs can be found in photography and images, but when combined many of these signs come together to form a chain of association, or a code, that conveys a message. When a signs in an image cause a viewer to make an association, that combination of signs is referred to as *metonymic code*. Examples of this can be seen in advertisements where a collection of signs imply a specific attractive quality, like a vehicle commercial where truck shown on a craggy mountain, covered in mud and surrounded by heavy rocks or logs makes the viewer assume that the truck is sturdy and dependable. In this example, the mountain, mud, and heavy materials are the signs that imply the quality of the truck. This project is aiming to create a similar kind of metonymic code that encourages the viewer to assume that an ecological site, portrayed with a given set of signs, is an appealing landscape and provides quality habitat for pollinators (Lester, 2013).



Figure 2.03 - Monarch butterfly during migration season (Author, 2018).

Visual Cues – When a person looks at an image, their eye and brain immediately seek specific cues that provide spatial and subjective context to what they are seeing. These cues provide the brain the information it needs to compose a complete image with information gathered from the eyes and can then be interpreted for meaning and content. These cues are highly studied by visual artists and compose all visual data on a flat surface like a photograph or painting. These cues can be broken into three categories: color, form, and depth. These categories contain a variety of individual elements that together give the viewer all of the visual information they need about an image to understand the subject, context, and meaning in a way that they can then develop their own opinion about it. These cues are what were used to generate the image factors that were tested in this project and formulate the code of signs that will convey the intended message of appeal and habitat quality.

Color – "We tend to associate a pleasant or bad experience with the colors of the objects that comprise the event… Green may recall a pleasant walk in the grass. Yellow might be the color of a balloon bought at a circus. Imagine any color of your choosing. Do you relate it to a specific object? Most people never associate color with a formless blob, but with a definite object. For that reason, memory of a color affects the perception of it Researchers have found that a memory of a red apple will make a printed picture of a red apple appear even more red. Because people associate colors with objects and events, this visual attribute is highly subjective and emotional" (Lester, 2013). As a sign, color is very subjective in its meaning, and frequently societal associations with color must be taught. For the purposes of this report, color represents a symbolic sign; one that carries an individual meaning to each person. In landscapes there tends to be a regular arrangement of color groups – various greens for foliage, browns, and a variety of floral and mixed colors. To test for the effect of color on an audience, these three variables of color (green, brown, and mixed) were isolated and used in the survey.





Form – Forms can be broken down into simpler elements of dots, lines, and shapes. Dots represent the simplest form possible, and are used as indicators, patterns, or to draw attention to a specific point. Lines are a string of dots with no spaces or gaps between them, and encourage the viewer's eye to follow it from start to end. Shapes are lines and dots combined into a geometric pattern. Often the subject of a visual piece can be simplified into basic shapes such as triangles, circles, or parallelograms (Lester, 2013). Form directly portrays the subject and can be categorized as an iconic sign, showing a direct representation of the subject through dots, lines, and shapes. In the landscape all kinds of forms can all be found composing a scene, from lines of grass blades, to the triangular shape of butterfly wings. Shapes of pollinators were the specific image factor being tested in the survey, to see whether viewers can identify the form of a bee or butterfly and what meaning they derive from it.

Depth – while form is a clear representation of a subject, and color conveys a clear meaning depending on the individual observing it, depth is complicated and informed by eight separate cues: space, size color, lighting, texture, interposition, time, perspective, and movement. All of these factors create an illusion of depth, mass, weight, and space that they brain can understand and imagine to be real (Lester, 2013). Some of these factors provide direct context or location information, like space, size, and time. Space frames the subject of an image and provides a location and setting for the subject to reside in. In landscape images, space is the location or setting, whether it be a forest, prairie, or lawn. Size, or scale, determines the amount of contextual information available to the viewer and is determined by the distance away from the subject the image is taken. Time frequently plays a role in images, whether through the method of capturing an image (oil paintings, Polaroid cameras, or smartphone filters) or even the time an image is taken, the seasonality of it.

Figure 2.04 - (top left) Comparison of colors found in the landscape (Author, 2018).

Figure 2.05 - (top right) Comparison of geometric shapes to shapes of pollinators (Author, 2018).

Figure 2.06 - (bottom left) Comparison of images taken at various site scales (Author, 2018).



Visual Preference Surveys

Visual Preference Surveys – One of the many tools for attaining public feedback is the public opinion poll and the visual preference survey. While public opinion polls are helpful when looking for general trends in preferences of an audience, visual preference surveys provide an additional level of detail because of their graphic nature ("Visual Preference Survey - eXtension," n.d.). "The visual preference survey (VPS) was originally developed as a public consultation tool by urban visionary, Anton Nelessen in the 70's […] [the visual preference survey] continues today as a participatory design and research tool with valuable applications," ("What Are Visual Preference Surveys and Why They Matter," 2018). In this report, the visual preference survey is the major method of collecting data about pollinator preference and perceptions of habitat quality in a designated group. The process of a visual preference survey is straightforward: an audience is presented with graphics, either in pairs or groups, where they can rate different options based on their own opinion. The images presented must be different, and have recorded, testable variables in them so that each rating implies preference of one set of variables over another. The factors that were used in this portion of the research were developed from a combination of the visual languages discussed earlier in this section. Results from the visual preference survey revealed which factors are influential in inspiring appeal and communicating habitat through visualization; these results were the foundation for creating a set of guidelines for designers to use during the process of creating visuals to communicate a design that provides pollinator habitat.

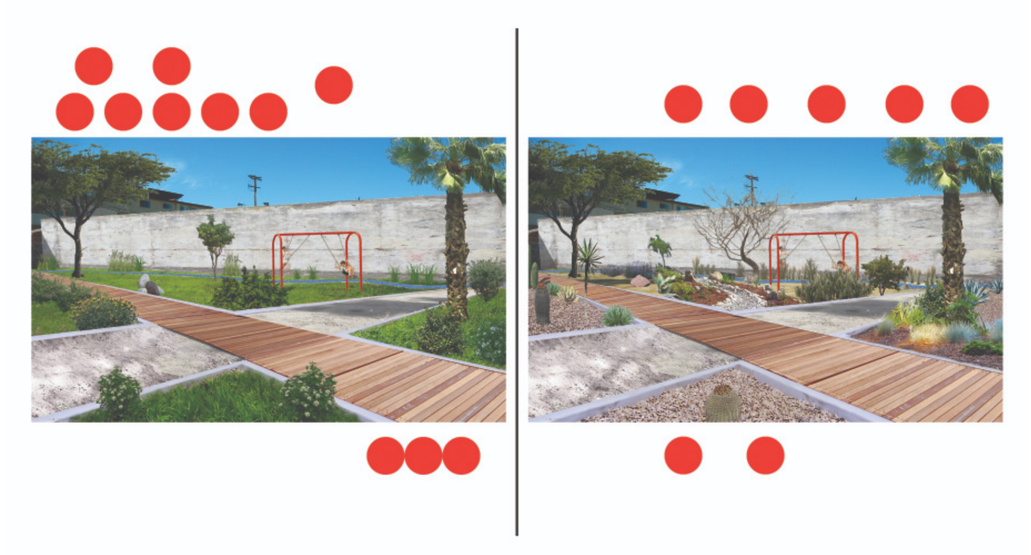


Figure 2.07 - Photo manipulation based survey comparing planting alternatives for a pocket park, conventional vegetation (left side) against xeriscaping (right side). The red dots represent an individual selecting that image as their preference. Cristhian Barajas via ("What Are Visual Preference Surveys and Why They Matter," 2018)

Ecological Design & Pollinator Habitats

Ecological Design and Pollinator Habitats – "An ecological design is a designed landscape based on the science of ecology […] [they] may abut or include natural ecosystems, but above all they are human creations. An ecological design may incorporate restoration of degraded ecosystems, but it does not principally seek to put things back the way they were. […] It aims instead to go forward, to apply out knowledge of nature to create high-performing landscapes in which our design goals and natural processes go hand in hand," (Beck & Franklin, 2013).

In this report, ecological design is the ultimate goal of implementing guidelines and inspiring appeal and communication of habitat quality. If an audience can see the habitat value and intrinsic beauty of ecological landscapes, they will hopefully be more likely to implement them, or approve of their implementation. In the past, ecological designs have been viewed as messy or neglected, causing an immediate bias and inclination to automatically disapprove of their implementation (Nassauer, 1995). One of the few ways to combat this is to show ecological sites in ways that and audience finds appealing and healthful, and this is the reason this study is so crucial – to explore the ways images can be structure to promote support for installing ecological landscapes in urban environments, especially ones that provide habitat for pollinators.

For the purpose of displaying how to use the guidelines developed in this report, a conceptual site design was generated for a campus site, implementing the accepted practices of ecological design and sustainable sites. These practices and their application in the site and its proposed maintenance are shown in the table on the left.

Source	Guiding principle	Application on Site	Application to Maintenance
Principles of Ecological Landscape Design	Create real habitat, not idealized habitat Plan for coevolutionary relationships Use ecological methods to limit harm from plant pathogens Invite native predator species to control pest populations Plan to include keystone species and environmental engineers	**1) Create real habitat for keystone species by using regional plants and plants needed for coevolutionary species (ex. Monarchs and Milkweed).**	**1) Use ecological methods of pest/pathogen control.** **- Source plants and seeds from organic growers** **- Use carnivorous insects and native birds for pest control** **- Allow harmless molds to remain on site**
An Ecological Approach to Urban Landscape Planning	The Ecologically Inspired Landscape: 1. Work with Nature 2. Enrichment through complexity 3. Landscape as a process 4. Creativity on site 5. Involvement of the users 6. Minimal energy consumption 7. The natural landscape outside the front door	**1) Design site for both ecology and for human uses** **2) Create complexities within designed habitat spaces by utilizing grade change**	**1) Reduce harmful emmissions and energy consumption** **- avoid using power tools to maintian the site** **- use sustainable methods to power site features**
Design for Human Ecosystems	The Ecosystem Concept: 1. Scale - ecology is a series of related systems and sub-systems 2. Design process - balance scientific information with design experimentation. Formulation, information, models, possiblities, plan evalutation, and management 3. Order - order enables spaces to fulfill human and ecological needs, and can be expressed three ways: Structure: elements and the relationships between them Function: flow of energy through systems Location Patterns: mimic lowcal environments	**1) Use habitat needs to determine site content** **2) mimic regional ecosystem orders to accommodate for local species**	**1) Use local materials.** **- Source regionally local plant species** **- Use local materials to reduce negative impact on site** **2) Mimic regional ecosystems by allowing for dead plant material to remain on site after growing season.**
Messy Ecosystems, Orderly Frames	Improve ecology without sacrificing appearance or function Neatness implies care, and care implies appeal Design to frame messy ecosystems with orderly elements that ease the visual transition and give context to the site	**1) Place the dense habitats within an organized site design** **2) More formalized features should provide context for the habitat elements**	**1) Use more rigid maintenance practices in the more organized planting areas and more ecological practices in the naturalistic habitat areas.**
Precedent: The Lurie Garden	Provide seasonal interest with color and texture Incorporate ways to achieve multiple vantages of the site Use infrastructure as a way to provide guides with maintenance	**1) Design for the dormant season** **2) Provide interaction with the site**	**1) Keep descecated plant material on site throughout the dormant season to provide habitat and interest, as allowed by fire safety practices.**

Table 2.01 - Justification of site design elements and maintenance strategies (Author, 2018). Sources: (Beck & Franklin, 2013; "Design for Human Ecosystems," n.d.; "Millennium Park," 2008; Nassauer, 1995; Ruff & Tregay, 1982)

Ecological Design & Pollinator Habitats

Pollinator needs in an urban habitat – Like many insects found in the wild, pollinators like bees and butterflies are primarily self-sufficient so long as their basic needs are provided for in a landscape – forage, water access, and shelter (Hall et al., 2017). Unlike in their native habitat, pollinators in urban habitats have to travel farther to reach foraging areas, and often have limited selection when it comes to foraging plants, water sources, and shelter options, however there is an abundance of pollinator species that make their homes in the city and these species should be provide for. Many views of pollinator conservation are changing now that urban landscapes are becoming viable locations for habitat – their lack of large herbivores and relatively low use of commercial pesticides (apart from suburban usage) makes them prime candidates for hosting sensitive pollinator habitats (Hall et al., 2017).

Bees and butterflies have some very specific foraging and shelter needs, a common example that is used is the relationship between Monarch butterflies and milkweed plants, where the butterflies entirely rely on the milkweed for laying their eggs and feeding their young. These kinds of plants are known as host plants or larva plants; though not all butterfly species require such specific plant selection as the Monarch, it is beneficial to know what local butterfly species prefer. In Northeast Kansas the Monarch butterfly needs some variety of milkweed to lay its eggs, Giant Swallowtails only lay eggs on prickly ash – a citrus plant, Tiger Swallowtails prefer plants in the cherry and plum family, Black Swallowtails show preference for more than sixty plants in the carrot family, and Zebra Swallowtail butterflies only lay their eggs on the Paw paw tree ("Butterfly Garden - Kansas Native Plants," n.d.; Shepherd, Vaughan, & Black, 2008).

No Hostplants, No Butterflies

Caterpillar hostplants are a vital component of butterfly habitat. It is often a lack of hostplants rather than nectar plants that limit the presence of a butterfly species.

Here are examples of hostplants and their butterflies:

- **Lupine—sulphurs, gray hairstreak, painted lady, and various blues**
- **Mallow—gray hairstreak, painted lady, and checkered skipper**
- **Thistle—painted lady and Mylitta crescent**
- **Nettle—question mark, Milbert's tortoiseshell, and red admiral**
- **Violet—various fritillaries**
- **Bluegrass—Juba skipper, common roadside skipper, and common ringlet**
- **Milkvetch—sulphurs, silvery blue, and tailed blue**
- **Bunchgrass—Juba skipper and common ringlet**
- **Willow—tiger swallowtails, green comma, question mark, mourning cloak, and viceroy**
- **Oak—Propertius duskywing**
- **Milkweed—monarch**

Figure 2.08 - Example list of host plants that butterflies rely on (Shepherd et al., 2008).

Besides host plants, many pollinators have special nesting or shelter needs. Many native bee species are solitary and do not rely on a large social hive structure like honey bees do. About seventy percent of these solitary bee species are ground-nesting species, who need loose top soil or compost to burrow down and lay their eggs below the ground, providing for these bees means leaving a patch of soil intentionally bare. Other species nest in holes drilled or tunneled into trees or in the pithy material of reedy plants, which can be simulated by bundles of dry bamboo reeds, or the more popular "bee hotels" that are sold in many garden centers. Social feral bees, like bumble bees, require a small cavity such as an abandoned mouse nest or an old glove to build their small hive-like cluster of brood cells, this can be mimicked by a nest box or a stack of terra-cotta pots. ("Butterfly Garden - Kansas Native Plants," n.d.; Pollinator.org, 2018; Shepherd et al., 2008).

The diet of pollinators varies from species to species – butterflies primarily forage for their own nutrition and are not picky about what flowers they collect nectar from. Bees on the other hand, besides collecting nectar to eat themselves, also collect pollen to feed their brood. Some bees are specialists who collect from a very specific range of flowering plants, while others are generalists who will gather from anything flowering at the time. Both kinds of bees are crucial for environments, and often plants develop relationships with those pollinators and come to rely on them season after season. To provide the best foraging for bees and butterflies, plan your plantings so that something is flowering throughout the season when bees and butterflies are active, be sure to have multiple species flowering at the same time, and choose flowers that have a variety of colors and shapes that provide forage access for various pollinators ("Butterfly Garden - Kansas Native Plants," n.d.; Pollinator.org, 2018; Selecting Plants for Pollinators, 2008; Shepherd et al., 2008).



Figure 2.09 - Purple coneflower in the evening sunlight (Author, 2017).

Questions and Investigation

Research Question: What visual elements can be used as communication tools by professionals in landscape architecture and ecological design to increase the understanding and appeal of pollinator spaces to the public?

Image Factors: These are the elements of an image that make it distinct and the key visual language elements that communicate the subject, action, and purpose of the image (Lester, 2013). There is a distinct drop off in what viewers perceive as ecological design, and what is ecological design (Nassauer, 1995) and much of this can be attributed to the fact that there is currently no understanding of what visual cues communicate habitat quality. Possibly, the development of this kind of visual language might impact the perception of beauty as well, where understanding informs aesthetic appeal. Lester lists categories of visual cues that convey content messages to viewers in an image: color, form, depth, and movement (Lester, 2013). For the purpose of this study, the focus is depth, color, and form, omitting movement due to the lack of all but implied movement in landscape images. Specifically: Color and what individuals perceive from it, Depth in Size of the image – where the subject is larger at a smaller scale and the reverse at a larger scale, Depth in Time as a progression through the seasons, Depth in Space as images are taken at different sites and different angles, and Form in Shapes of pollinators and vegetation (Lester, 2013). These factors are the basis for creating a visual language and set of guidelines for landscape architects and designers to utilize.

METHODOLOGY



METHODOLOGY

Investigative Process

– The purpose of this project is to find what visual elements can be used as communication tools by professionals in landscape architecture and ecological design to increase the understanding and appeal of pollinator spaces to the public. The process laid out in this chapter provides a structure for investigating and achieving this goal:

1) Formulate Questions
2) Seek out the Answers
3) Share through Education
4) Demonstrate Findings

I. QUESTIONS

What types of sites (green roof retrofit with native plants, naturalistic meadow-like garden, traditional lawn) are perceived as visually appealing? What are perceived as habitable for pollinators? Is there a relationship between the two? What visual factors (site, scale, season, color, pollinators visibly present) impact perceived beauty and habitat quality? How does education/ professional background, gender, age, and location impact the response to perceived appeal or habitability? These questions have been structured by the Literature.

II. ANSWERS

The first set of questions lead to understanding about visual appeal, communication, and the relationship between the two. The second individually illuminate factors that can be identified as appeal-impacting elements, and elements that provide information about the represented image. The final set of questions reveal tailored nuances between demographic types and their communication and visual preferences. All these answers were found by conducting a Survey.

III. EDUCATE

The answers to the above questions provide knowledge about what image factors to focus on for specific public demographic types. Some answers explain what qualities are visually appealing, while others illuminate what qualities provide information that help with understanding habitat function. From the answers found in the survey, and set of Guidelines were produced as education tools.

IV. DEMONSTRATE

Information gained from pursuing these questions will be important in the creation of ecological designs and their presentation to the public. With an understanding of what factors to include or emphasize in a presentation, designs can be developed with more finesse and presented in favorable ways to the public audience, by way of an Illustrative Design.

Figure 3.01 - Process flow diagram (Author, 2018).

Project Process & Methods

Process:	Methods:
INVESTIGATION:	**Literature Review:**
- Formatted and educated by the Literature.	← - Study of pollinators, visual communication, investigation strategies, and ecological site design
RESULTS:	**Visual Preference Survey:**
- Findings from conducting a survey and site program concept from literature.	← - Digital survey conducted with photographs to find what visual elements communicate appeal and habitat quality. Distributed through social media.
REFINE:	**Develop Guidelines:**
- Analyze results to find applicable findings and how they interact with creating visuals	← - Create a implementable strategy for applying the findings from this project to future design visuals, in a way that can be used by professionals in landscape architecture and ecological design.
IMPLEMENT:	**Illustrated Design:**
- Create a strategy for sharing guidelines with professionals	← - Using the conceptual site program generated from the literature, the guidelines will be applied to a number of design visuals to illustrate how to use them when creating perspective graphics.



Figure 3.02 - Vibrant blooms in the Memorial Stadium green roofs (Author, 2017).

Methods Outline

– The tools and strategies used to achieve each step in the investigative process:

1) Literature Resources
2) Survey and Analysis
3) Formulation of Guidelines
4) Illustrative Design

I. LITERATURE

Collection of text describing the merits of visual preference studies and what specifically can be learned from them. A literature review will set the structure for formulating a survey, what factors to specifically test, and what to look for during the analysis. Literature will also provide the foundation of the ecological site design that will be used in the illustrative design.

II. SURVEY

Conduction and analysis of a visual preference survey will determine what photographic elements (specifically site, scale, season, color, and visual presence of pollinators) are considered favorable by the public, and which factors communicate the quality of habitat present.

III. GUIDELINES

Generation of a booklet of guidelines for professionals in landscape architecture, ecological design, or the public sector to use when presenting designs for pollinator habitats and other ecological spaces. These guidelines will illuminate the conclusions drawn from the visual preference survey and summarize their impact on audience perceptions of appeal and habitat quality.

IV. ILLUSTRATIVE SITE DESIGN

Presentation of guidelines in illustrative conceptual design for the West Quad. Showing transformation from traditional lawn space into flexible use space for human visitors and also sustainable pollinator habitat, with pulled-out pointers for professionals to note when creating similar imagery.

Selection of Image Factors

Semiotics, Visual Cues, & Image Factors -

As discussed in the background chapter of this report, semiotics is the study of signs and their meaning. Signs break down into three types: iconic signs which represent exactly the subject of their meaning, indexical signs which have a logical connection to the subject they represent, and symbols which are an abstracted representation of their subject and often must be taught or learned. When combined in an image with the intention of encouraging the viewer to make an assumption, a combination of signs is referred to as a metonymic code. This report aims to develop a metonymic code that conveys the message of appeal and habitat quality when representing ecological landscapes. To do that, there first needs to be an identification of what signs contribute to that message.

When observing an image, a viewer's eyes and brain work together to find key visual cues that give them an understanding of the context, subject, and meaning represented. These visual cues are color, form, and depth. Color is a very abstract and subjective sign and when used to convey a meaning it becomes a semiotic symbol. Depth contains the most factors, and each one informs a portion of an image's context, but does not directly represent what is being conveyed, so it is an indexical sign. Form directly represents the subject, whether as an abstract shape or as a realistically rendered form, and so is an iconic sign.

With these visual cues assigned to signs, we can begin to determine which elements of each cue are found in a landscape and provide relevant information through an image. Color is fairly straightforward; in landscapes colors like greens, browns, and mixed bright colors can be found in almost any context. Color conveys the feeling of an image, whether a person finds it pleasant or unpleasant, and also communicates the health and variety of a site. Dots, lines, and shapes can all be found in a landscape, communicating the forms of vegetation, rocks, ground elements, and even creatures within the landscape. Form deals directly with the subject of an image, so in this study it will be the form of pollinators that will be the focus of this factor. The presence or absence of the pollinator forms will be one of the indicators of appeal and habitat quality. After color and form, depth become much more complicated. Some factors of depth apply more heavily in landscape images than other, and some are better at conveying context and location than others. For the purposes of this report, space, size, and time will be the key depth factors that will be considered for testing. Space (site) provides context of location, size conveys the scale of an image and what amount of information can be collected in a single frame, and time provides context of seasonality.

Sign Types	Visual Cues	Image Factors for Survey
Symbol	Color	Color (green, brown, mixed)
Iconic	Form (dots, lines, shapes)	Form of Pollinators (present, absent)
Indexical	Depth	
	- Space	Site (Quad, Green roofs, Meadow)
	- Size	Scale (large, human, small)
	- Time	Season (growing, dormant)

Table 3.01 - (left) How Signs and Visual Cues combine into Image Factors (Author, 2017).

Table 3.02 - (right) Image factor cross comparisons (Author, 2017).

		Sites			Scale			Season		Colors			Pollinators Present	
		Memorial Stadium	The Meadow	The Quad	Whole Site	Inside Site	Features	Growing	Dormant	Variety	Green	Brown	Yes	No
Sites	Memorial Stadium													
	The Meadow													
	The Quad													
Scale	Whole Site													
	Inside Site													
	Features													
Season	Growing													
	Dormant													
Colors	Variety													
	Green													
	Brown													
Pollinators Present	Yes													
	No													

Redundancy

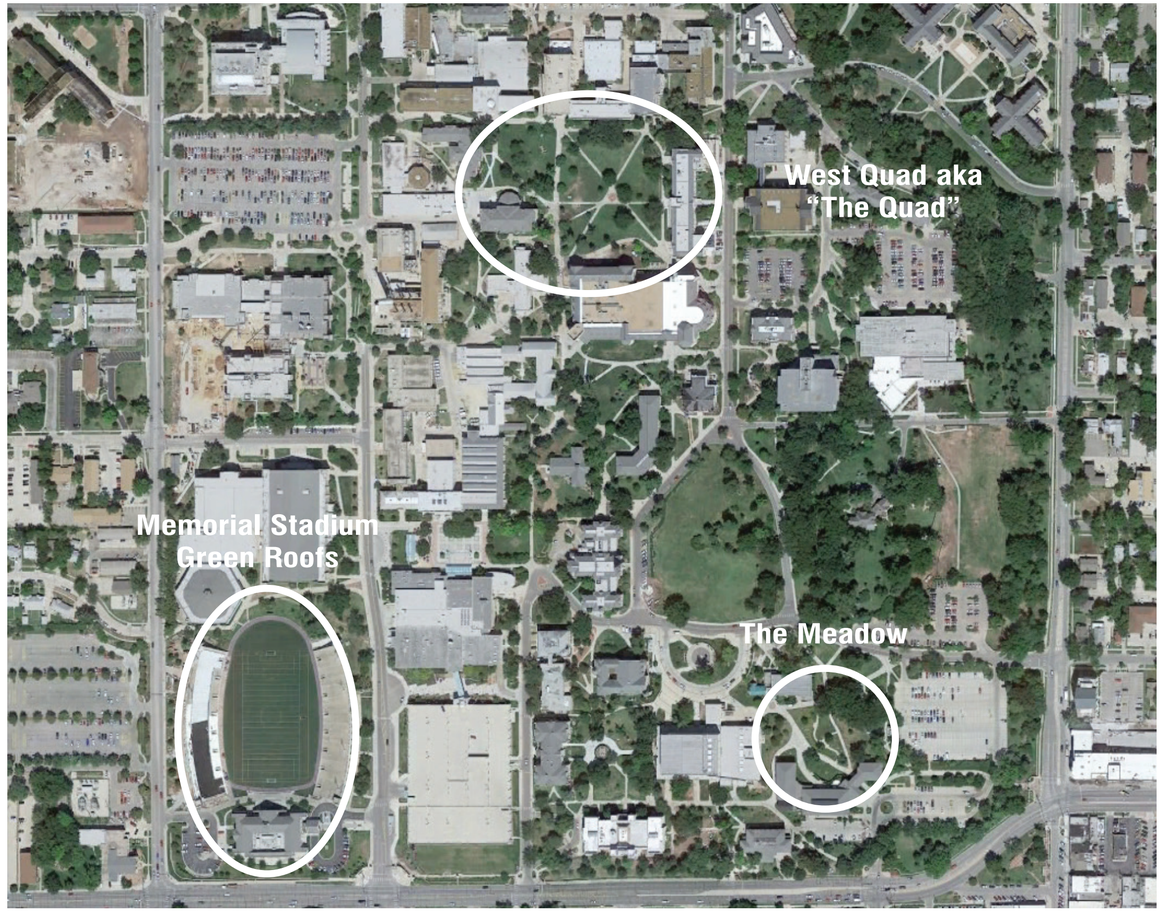








Figure 3.03 - (left) Map of campus sites (Google Earth, 2018).

Figure 3.04 - (top) Aerial image of Memorial Stadium green roofs (Author, 2017).

Figure 3.05 - (middle) Aerial image of the Meadow (Author, 2017).

Figure 3.06 - (bottom) Aerial image of the Quad (Author, 2017).

Site Selection & Image Collection

Site Selection

The sites for this report were limited to sites on the Kansas State University campus in order to ensure year-round access for image collection, population density comparable to dense urban areas, and the high amount of foot traffic similar to urban settings. Kansas State University also sports a variety of landscape design techniques, from traditional manicured lawnscapes, to rainwater gardens, to designed natural spaces, and even planted green roofs. From these landscapes, three were selected to show the range of landscape types: manicured to natural.

Traditional Landscape:
The campus Quad, characterized by a grassy lawn, a scattering of shade trees, and peripheral planted beds.

Semi-Naturalistic Ecological Landscape:
The Memorial Stadium Green Roofs, a retrofit in the former bleachers of the Memorial Stadium using native prairie vegetation and engineered soils and media control.

Naturalistic Ecological Landscape:
The Meadow, located next to the campus art museum, filled with native grasses and flowers, with designed pollinator habitats set apart from spaces designed for human interaction.

Image Selection

Images were collected seasonally between December of 2016 through November 2017 to capture the sites in every aspect of seasonality. Images for the survey, besides complying with the arrangement of image factors being tested, were also selected for their compositional strength, adherence to the factor being tested, and visual appeal to the author. To eliminate personal bias, all images taken with poor composition, shot out of focus, or containing too many undesirable elements (such as trash cans, survey flagging, or other distracting materials) were removed from consideration for survey use. Every effort has been taken to show each site in the most appealing way possible to ensure that the survey-takers do not feel guided towards one option over another.

Survey

The conduction and analysis of a visual preference survey will help to determine what photographic elements (specifically site, scale, season, color, and visual presence of pollinators) are considered favorable by the public and show which demographics are drawn to which image factors. The survey was set up during the fall semester of 2017 and released on November 28 of that year and closed out on January 31st of 2018. Analysis of the survey will look at the overall ratings of the images in the survey, apply that to the combination of factors present in each image, and draw conclusions from the ratings of those image factors. Analysis will also observe trends in demographics for more targeted audiences. The survey will be conducted entirely online, and distributed by personal contact and Facebook groups. One hundred responses are desired, but more will vastly contribute to the results collected. The goal of this survey is to see what people unaffiliated to landscape architecture or ecology think and feel about pollinator spaces, so respondents should be individuals with education and backgrounds in fields outside of ecology and landscape architecture.

Survey Setup Guidelines

Questions:

1) What image factors convey the metonymic coded meaning of visual appeal of ecological spaces, and which image factors convey the quality of habitat in ecological spaces?

2) What differences are there in the effectiveness of image factors between demographic groups?

Hypotheses:

- The images that contain the factors of vibrant colors, sites with flowers, in the growing season, shown at small scales, and containing pollinators – specifically butterflies – will invoke the highest approval response. Similarly, these same factors will also communicate the best quality of habitat to viewers.

- Respondents with some amount of gardening, horticulture, or ecological experience will be more inclined to enjoy the images presented, and better recognize images that convey pollinator habitat. Younger respondents will have higher approval and recognition than older respondents, and women will find greater appeal in images containing messy landscapes, flowers, and pollinators.
The first question will rely on descriptive statistic results, using the mean, or average, of responses to determine which image factors respondents find appealing and convey habitat quality. The second question will be heavily reliant on inferential statistics, using demographic responses to find trends in portions of the sampled population.



Figure 3.07 - Photograph of bee balm blossoms in the Memorial Stadium Green roofs (Author, 2017).



Figure 3.08 - Photograph of a native bumble bee enjoying blooms in the Stadium Green roofs (Author, 2017).

SURVEY

Survey Composition:

According to Rumsey, a survey can be completed in 10 steps (Rumsey, 2015):

1. Purpose of the survey
2. Define the target population
3. Choose the type of survey
4. Design the questions
5. Consider the timing of the survey
6. Select the sample
7. Collect the data
8. Follow up
9. Organize and analyze data
10. Draw conclusions

1. Purpose of the survey: This exploratory survey will set out to answer the question of which image factors communicate appeal of ecological spaces and which factors communicate habitat quality to a general public audience. The information gained from this survey will inform the creation of a set of guidelines that can be used by designers when advocating for ecological urban spaces to be implemented. To make this purpose clear, in the introduction of the survey there will be a brief summary of the purpose and importance of the survey being taken.

2. Define the target population: This survey will be targeting a broad population of decision-making citizens of English-speaking countries, like the United States. Because the pollinator crisis is a global issue, and urban settings exist in all developed nations, the survey will be open to an international audience.

3. Choosing the type of survey: this report is focused on finding what image factors individuals find most appealing and communicate habitat quality, so it logically leads to the conduction of a visual preference survey. A visual preference survey is a technique for obtaining public feedback on visual representations, allowing

Survey

them to provide feedback for designs. In this instance, a visual preference survey will be the format followed to discover what existing elements in a landscape should be emphasized during the design presentation process to create appeal and communicate habitat quality and purpose. Parts of this survey will also be a short-answer style to encourage respondents to provide more in-depth feedback about ecological spaces.

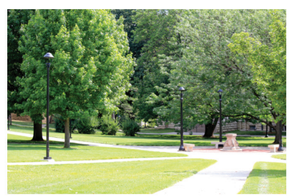
4. Design the questions: There will be two kinds of questions in this survey, both of which rely on an associated image. The first kind of question will be a visual preference and habitat quality rating setup, where the respondent is shown an image of a site (containing a structured array of image factors to be tested) and asked to rate the appeal of it and what they believe the habitat quality to be. The second kind of question will be a short answer; the respondent will be shown an image of each of the study sites where images were collected and asked to describe their opinions and impressions of the site.

a. The visual preference images will be images taken from the three focus sites. These images will contain an arrangement of the five factors being tested so that each individual image represents a factor being tested in conjunction with a specific arrangement of the other four factors. (i.e. Factors A1.B1.C1.D1.E1 vs A1.B1.C1.D1.E2; thus the factor being tested for is E-variable). Each image has two questions attached to it – one asking for the respondent to rate the appeal of the image as a whole, and one asking the respondent to rate the perceived habitat quality of the site portrayed in the image. To test each variant of the image factors, this portion of the survey contains 67 individual images with two questions a piece.

b.The short answer questions will have one image a piece, an image selected to show each site in an appealing way to the survey-taker, and ask that the respondent give their opinion about the site depicted. This will give a clearer understanding of what individuals are using as a means to judge appeal and habitat quality in the previous section.



Briefly describe how you feel about the image above. What do you like or dislike about it? What does it make you think of? How would you feel if you were in the location depicted?



Briefly describe how you feel about the image above. What do you like or dislike about it? What does it make you think of? How would you feel if you were in the location depicted?



Briefly describe how you feel about the image above. What do you like or dislike about it? What does it make you think of? How would you feel if you were in the location depicted?

Figure 3.09 - Short answer questions in the Visual Preference Survey (Author, 2017).

- This survey will be released during the winter break between fall and spring semesters at Kansas State University to maximize the amount of time put towards collecting and analyzing data. This may lead to discrepancies in collection dates and times due to recipients being away on vacation and unable to access the survey from the internet. The duration of the survey will be between 20-30 minutes, which is a long time for respondents to spend answering a single survey. This may skew results as people get overwhelmed or distracted the further into the survey they go.

6. Selecting the Sample: As this survey is exploratory in nature, it will be distributed to a small non-random sample, using a snow-balling effect of sharing between contacts. This means that the results will accurately represent a population of people that have personal contact with the author or with contacts who have personal contact with the author. There will be a number of limitations posed in this sampling strategy, and should be resolved if further exploration is done on this topic.

7. Collecting Data: The survey will be conducted starting November 28th of 2017, and will be concluded on the last day of January 2018, giving the survey 9 weeks to circulate and collect responses. Each survey is anonymous and asks no questions that would reveal the identity of the respondent, so survey-takers can feel comfortable answering honestly to questions. Biased answers are not an issue, since bias and personal opinion is one of the factors being studied in this survey.
8. Following up: To encourage continuing responses, the survey will be posted on social media every couple of weeks during the time it is live, in order to remind individuals to participate if they have not already.

9. Organizing and analyzing data: The survey will be conducted entirely online through Kansas State University's survey system – Qualtrics. This system provides analyst tools to show the mean distribution of responses, responses based on demographic data, and ways to textually analyze short answer responses. Images in the preference section are rated 0-100 on appeal and habitat quality, and the mean rating will be used to determine which images ranked highest.



Rate the image above on how beautiful or appealing you find it, and then rate it again for how well you think it provides habitat (food and shelter) for pollinators.

Low High
0 10 20 30 40 50 60 70 80 90 100

Beauty/Appeal

Habitat Quality



Rate the image above on how beautiful or appealing you find it, and then rate it again for how well you think it provides habitat (food and shelter) for pollinators.

Low High
0 10 20 30 40 50 60 70 80 90 100

Beauty/Appeal

Habitat Quality

Figure 3.10 - Example of the questions found in the rating section of the Visual Preference Survey (Author, 2017).

Those images will then be analyzed for image factors present and the ratings will then be assigned to those factors. The short answer responses will be read and analyzed for positive or negative feedback, and notes will be taken about which specific factors individuals found appealing or unappealing.

10. *Drawing conclusions:* from the ratings assigned to image factors, a ranking of effectiveness will be assigned to each factor. The factors that respondents find most appealing and best at communicating habitat quality will be ranked high, and ones that were considered unappealing or poorly communicated habitat quality or implied poor habitat quality will be ranked low. These results will educate a series of guidelines that can be used when creating visuals for proposed ecological designs in the future to increase appeal and communication of habitat purpose and quality.

Limitations:

This exploratory survey contains limitations that should be resolved in the future if this train of investigation is to be pursued further. In the survey itself, the sample collection is non-random, due to the personal connections between survey-takers and the author of this report. The sample also over-represents individuals geographically clustered near where the author lives and where the author's family lives (Kansas and Texas), and by using an online survey the respondents outside of family connections are limited to those who speak English, have access to the internet and social media, and frequent the same social media sites as the author. The survey is also very long, which may skew results as respondents continue to finish the survey faster, and may lead to a large number of drop-outs who opt out of finishing the survey for time's sake. Of the images themselves, there are several image factors and visual cues that are not being considered in the survey to conserve time and narrow the field of focus. Respondents may have an unconscious response to these factors and have an impact on the results of the survey.

Conceptual Campus Site Design

To demonstrate these guidelines in action, a conceptual design was programmed for the West Quad site on Kansas State University campus - the manicured site example used in the survey. The site was designed using conventional ecological site design with the intent of providing more forage and habitat for local domestic bees and native feral bees. To showcase this design, visuals was created using the guidelines developed from the results of the visual preference survey. The West Quad was selected because it is one of the most interacted-with landscapes on the Kansas State University campus and has some of the least available pollinator habitat due to its expansive lawn and little blooming material. Challenges of this site include the characteristic amount of interaction with people. The site is very flexible for gatherings and provides pathways for enormous amounts of foot traffic. These uses will be preserved in the projective design, while also providing spaces for pollinators. Spaces that pollinators can safely forage and use as habitat for their young and to hibernate in the winter are difficult to maintain in an urban setting due to the high level of interaction with people. These spaces needed to be specifically designed to be left undisturbed during certain periods of the year and set away from major traffic areas of the site.

To create the conceptual site design for the Quad on Kansas State University campus, a series of resources and precedents were selected and analyzed for their suggestions and design guidelines. Those guidelines were then synthesized into two categories: how they apply to the site design, and how they apply to the continued care of the site. All of the precedents selected demonstrate foundations of ecological design, and many delve into the complexities of how people relate to ecological spaces. To showcase the two strategies of visual guidelines created from this research, portions of the site represent each style of site used in the survey (manicured areas, semi-naturalistic spaces, and naturalistic spaces).

Source	Guiding principle	Application on Site	Application to Maintenance
Principles of Ecological Landscape Design	Create real habitat, not idealized habitat Plan for coevolutionary relationships Use ecological methods to limit harm from plant pathogens Invite native predator species to control pest populations Plan to include keystone species and environmental engineers	**1) Create real habitat for keystone species by using regional plants and plants needed for coevolutionary species (ex. Monarchs and Milkweed).**	**1) Use ecological methods of pest/pathogen control.** **- Source plants and seeds from organic growers** **- Use carnivorous insects and native birds for pest control** **- Allow harmless molds to remain on site**
An Ecological Approach to Urban Landscape Planning	The Ecologically Inspired Landscape: 1. Work with Nature 2. Enrichment through complexity 3. Landscape as a process 4. Creativity on site 5. Involvement of the users 6. Minimal energy consumption 7. The natural landscape outside the front door	**1) Design site for both ecology and for human uses** **2) Create complexities within designed habitat spaces by utilizing grade change**	**1) Reduce harmful emmissions and energy consumption** **- avoid using power tools to maintian the site** **- use sustainable methods to power site features**
Design for Human Ecosystems	The Ecosystem Concept: 1. Scale - ecology is a series of related systems and sub-systems 2. Design process - balance scientific information with design experimentation. Formulation, information, models, possiblities, plan evalutation, and management 3. Order - order enables spaces to fulfill human and ecological needs, and can be expressed three ways: Structure: elements and the relationships between them Function: flow of energy through systems Location Patterns: mimic lowcal environments	**1) Use habitat needs to determine site content** **2) mimic regional ecosystem orders to accommodate for local species**	**1) Use local materials.** **- Source regionally local plant species** **- Use local materials to reduce negative impact on site** **2) Mimic regional ecosystems by allowing for dead plant material to remain on site after growing season.**
Messy Ecosystems, Orderly Frames	Improve ecology without sacrificing appearance or function Neatness implies care, and care implies appeal Design to frame messy ecosystems with orderly elements that ease the visual transition and give context to the site	**1) Place the dense habitats within an organized site design** **2) More formalized features should provide context for the habitat elements**	**1) Use more rigid maintenance practices in the more organized planting areas and more ecological practices in the naturalistic habitat areas.**
Precedent: The Lurie Garden	Provide seasonal interest with color and texture Incorporate ways to achieve multiple vantages of the site Use infrastructure as a way to provide guides with maintenance	**1) Design for the dormant season** **2) Provide interaction with the site**	**1) Keep descecated plant material on site throughout the dormant season to provide habitat and interest, as allowed by fire safety practices.**

Table 3.03 - Justification of site design elements and maintenance strategies (Beck & Franklin, 2013; "Design for Human Ecosystems," n.d.; "Millennium Park," 2008; Nassauer, 1995; Ruff & Tregay, 1982)

2.2 GUIDELINES

A. Size and Scale

- In designing a node, the size shall be based on existing and anticipated usage of the area with consideration given to the nature of the surrounding architecture.
- Factors to consider include: circulation requirements such as pedestrian and bicycle traffic volumes, access for emergency vehicles, fire trucks and service vehicles and functional requirements such as space for gathering, sitting, performing the display of art, etc.
- The design and placement of paving, furnishings and plantings shall be scaled to fit the character of the node. Narrow walks, small sitting areas and detailed plantings are appropriate for courtyards, while these may not be suitable for larger plazas expected to accommodate many more people.



Seat Wall

B. Seating and Furnishings

- Choice of site furnishings, such as benches, trash receptacles and signage shall be incorporated in all nodes based upon activities the node supports.
- Adequate seating for resting, waiting, meeting, sunning and many other activities is essential to the success of a pedestrian campus and shall be provided at all pedestrian nodes.
- The use of seat walls to increase sitting opportunities is encouraged if the wall also has other functional uses, like retention or container for plantings.
- Standards for Site Furnishings are located in Section 6: Site Furnishings.

Figure 3.11 - Example of Guideline structure - from Clemson University Site Design Guidelines 2002.

Guidelines

The final goal of this report is to use the results of the visual preference survey to generate of a set of guidelines for professionals in landscape architecture, ecological design, or public sector to use when presenting designs for pollinator habitats. These guidelines revolve around ways to use the image factors studied in the preference survey to convey the appeal and habitat quality of ecological designs in urban spaces.

These guidelines will be directly structured from the two kinds of questions asked in the visual preference survey: the image ratings and the short response sections. Because of its focus on image factors independent of site, the guidelines related to the results of the image rating section will entirely revolve around which image factors to emphasize in any given site visual, specifically for perspective renderings. The guidelines that evolve from the short answer section focus on providing structure to creating images for various styles of sites. Strategies shown in the guidelines will be tailored to the direction designers are going in the design process: general guidelines for representation of pollinator habitat sites, or specific strategies for various types of habitat sites.

These guides should be used in the creation of design visuals like perspective renderings, and do not apply to site plans or technical drawings. The goal is for these guidelines to be the foundation of creating a visual language that communicates visual appeal and the quality of habitat provided by a represented design. By creating more appealing design visuals, the hope is that more pollinator habitats will make their way from concept into practice and begin the trend of restoring pollinator populations and bettering the future of humanity and the environment.



FINDINGS

FINDINGS

Site Design

Creating a conceptual site design for the Quad provided a subject for generating design images like perspective renderings that demonstrate the guidelines developed later in this report. This site design will be focused on turning the current Quad structure into a site that provides plentiful habitat for pollinators, and still provide the flexible usability that characterizes the site now. All three types of habitat styles - manicured, semi-natural, and naturalistic - are included in areas of the site so that representations of those spaces can follow the structure of the guidelines laid out in the next chapter. In order to preserve the function of the site, the use of the site was observed during the warm season when school was in session and those uses will be planned for in the design while also incorporating new enjoyable uses of the space.

Site Analysis - The main traits of the current site to be maintained are the circulation, the site usage, and the shade provided by trees. This site sees incredibly heavy foot traffic on a daily basis as students move to and from their classes every hour, so maintaining the major pathways is important to preserving the function, shown in the top image on the right. Another aspect of the site is where people relax and play: primarily in the lawn spaces and the shaded areas. The middle figure on the right shows the usage of the site with color coding: green spaces are completely unused, orange spaces are used for recreation, and the purple space is a memorial that people visit. One of the popular recreation activities on site is the use of personal hammocks in the shaded areas. The bottom image shows the presence and density of shadow on the site, in order to preserve deep shade for recreation, and sunny areas for plantings.

Slope - this site is not noticeable sloped until you step into the space. The entire site has over 22 feet of grade change. The grading diagram on the right-hand page shows the slopes over various parts of the site, and some of the proposed changes that would create interest in the new site design. Because of the slope of the site, there is an opportunity to implement storm water systems at the lower end of the space, reducing the overall runoff of the site and reducing the impact on flooding.

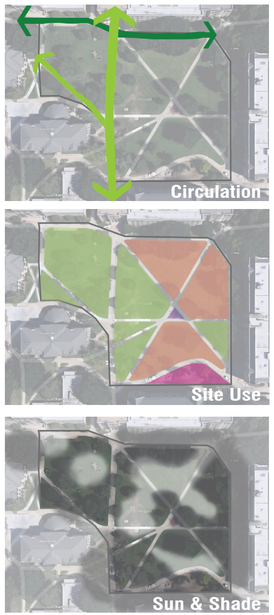


Figure 4.01 - Above: Top - Major circulation paths Middle - Site usage diagram, green = unused lawn, orange = recreation, purple = memorial site Bottom - Shade and sun areas (Author, 2018).

Figure 4.02 - Right: Grading plan, showing the slopes on the site and the proposed earthwork (Author, 2018).



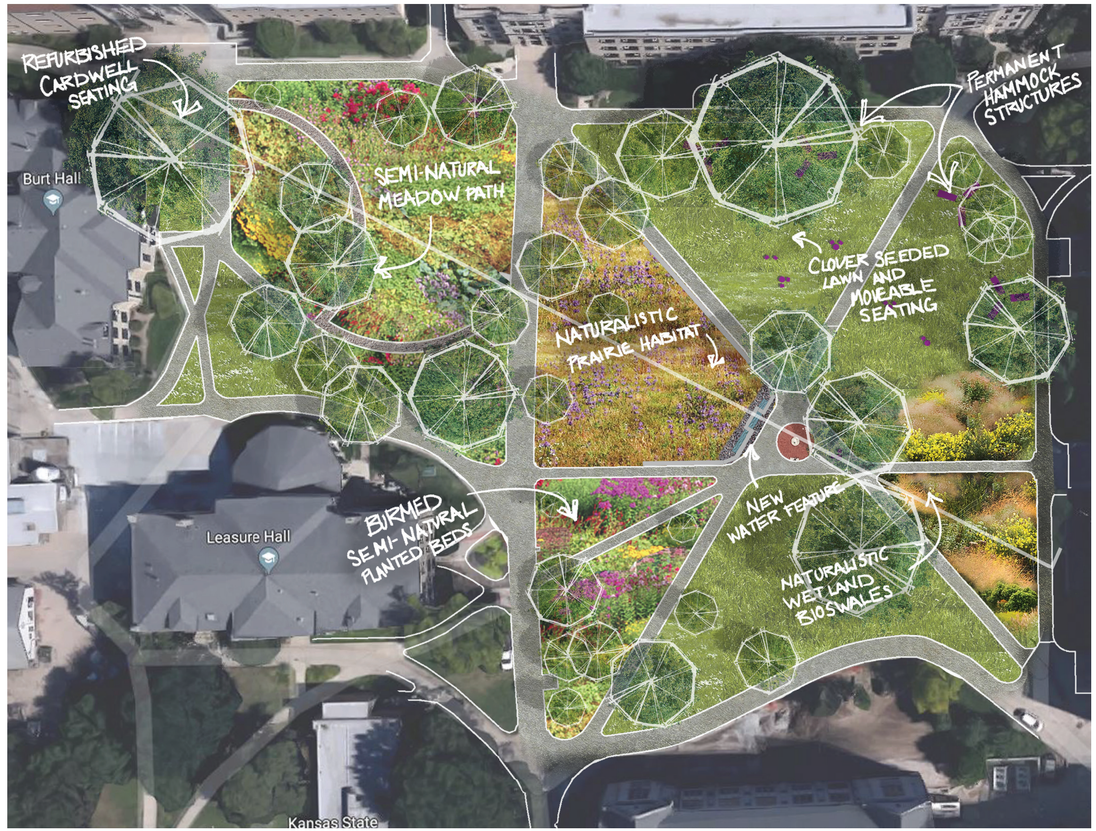


Figure 4.03 - Left: Site Plan "The Prairie Quad" (Author, 2018).

Site Design

The entire site is dedicated to creating different levels of pollinator habitat, following the recommendation of Joan Nassauer (1995) to surround healthful, messy habitat with more organized design. Because this site has to provide both pollinator and human habitat in the same spaces, there are also levels of separation through the use of grading and dense plantings to create safe habitat for pollinators and level clear spaces for people to use for recreation and enjoyment.

Site Program -

Cardwell Seating - The seating outside of Burt hall, in front of Cardwell is an under utilized outdoor space, and this is due primarily to its dilapidated appearance and rickety wooden benches, despite the great shade and view. To improve this space and tie it in with the rest of the quad, the benches should be replaced with new limestone block benches, and the hardscape redone in crusherfine gravel.

Semi-Naturalistic Meadow Path - a currently bland lawn with scattered trees and a single rose bed on a slight hill. This space could be put to better use with drifts of colorful prairie natives and vibrant ribbons of pollinator-promoting blooms. The path through this area would be crusherfine and lead to stone benches beneath the shade of the larger trees in this area. Some steps would be necessary in the wester branch of the path to overcome the steep grade change.

Naturalistic Pollinator Habitat - This area is the dense, protected habitat area, separated from the human spaces by the limestone retaining wall that doubles as an interactive water feature.

Semi-Naturalistic Berm beds - These beds would have some dramatic grading to build up the bed, simultaneously providing seclusion for habitat and to showcase the arrangements of the plantings of native blooms and grasses. The edges of this bed would be contained by limestone edging.

Nontraditional Manicured Lawn - This area preserves the look of a beautifully maintained academic lawn, but with reseeding of clover or thyme, which grows low but blooms to provide for pollinator forage. This space also contains moveable seating and tables for visitors of the site to arrange.

Hammock Zone - Permanent hammock installation in the areas where individuals hammock the most, and in areas where the shade is dense but trees are spaced far apart.

Wetland Bioswale - Native wetland grasses and plantings to provide sustainable storm water management on site.

Sundial and Waterfall - A new fountain provides interactive sensory appeal in the memorial seating, while also providing a water source for pollinators within the habitat area.

Survey Results & Analysis

This survey was opened on November 28, 2017 and ran through January 31, 2018, for a total of 65 days. 75 responses to the survey were recorded, 28 of which were incomplete responses and not included in the data analysis. Of these 47 completed responses, one person elected not to answer the short answer questions, so their responses were recorded as neutral and neither add nor detract from the ratings. Due to the small sample size, the focus of this section will be on analyzing the image factors alone, and not include demographic trends except as anecdotal evidence.

The analysis of these images was performed in a combination of Qualtrics, using their site tools, and in Excel. The images in the survey were each assigned a number based on their order in the survey and the answers to the questions given a secondary number to distinguish the rankings (ex. Question #3.1 refers to the appeal ranking score for the third image in the survey, and question #3.2 refers to the habitat quality score for that same image). Once each question had a mean score assigned to it, generated from the cumulative scores given by each individual survey response, the questions were arranged in an order from highest to lowest. Questions were ranked independent of their image, so the appeal of one image could be ranked very high while its habitat quality may be ranked lower. From this ranking array, the top ten appeal mean scores and the top ten habitat quality mean scores were recorded, along with the bottom ten of each. These are the images that will be analyzed for image factors relating to appeal and habitat quality.

The short answer portion of the survey is intended to see what kind of site design (from highly naturalistic to highly manicured) people preferred. The short answer responses were coded in order to apply a score to each response. Answers that directly stated approval or disapproval of the site gained an automatic score of either “appealing – 100” or “unappealing – 0”. Answers that contained neither direct approval or direct disapproval were given a score of “neutral – 50” and were characterized by responses that said “no preference” or “I feel neutral”, or responses that listed positives as well as negatives of the site without giving a indicating approval. Other common words in various responses were recorded to see if there were trends in word selection and approval, such as the word “natural” being used to describe desirable naturalistic landscapes as opposed to “messy” describing undesirable naturalistic landscapes.



Figure 4.04 - Bee enjoying some of the native plantings in the Meadow site (Author, 2017).

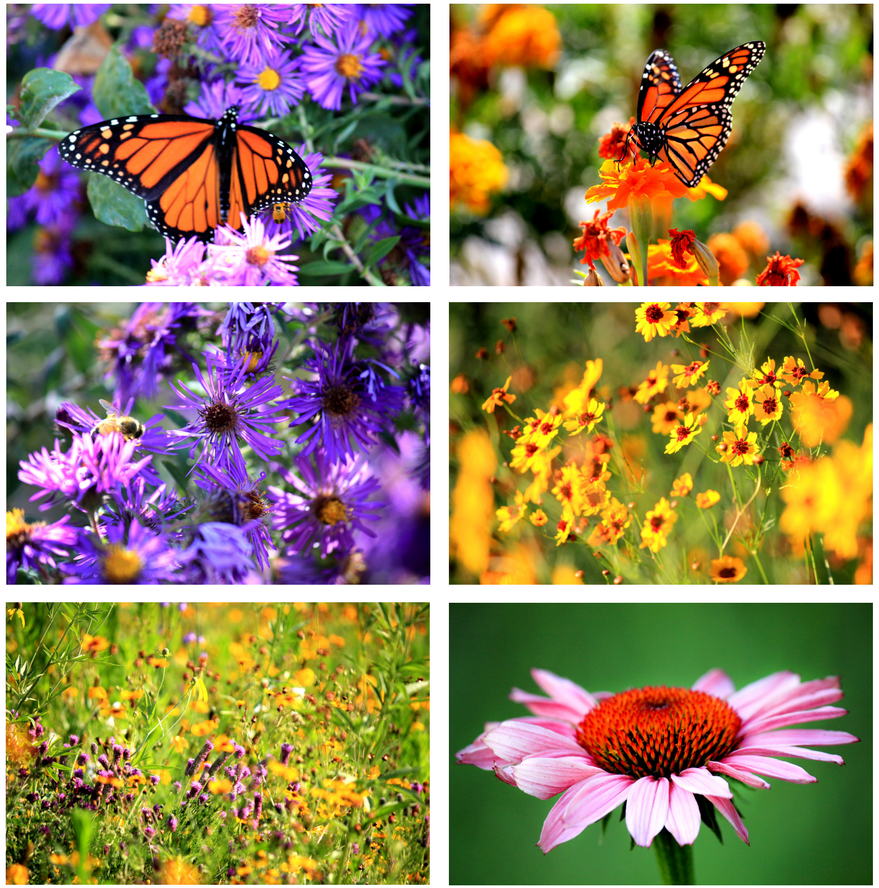


Figure 4.05 - The top 10 images rated for visual appeal (Author, 2018).

Image Ratings - High Appeal

Images ranked highest for appeal overall are shown on this page. These images contain the following image factors: the Meadow and the Memorial Stadium green roofs, feature scale, growing season, variety of colors, and pollinators present. Both bees and butterflies are equally represented in this collection of images, indicating that both are seen as desirable inhabitants of an ecological site.



Image Ratings - Low Appeal

This page shows the images rated lowest for appeal. The show the Meadow prominently during the dormant season (6 out of 10 images) and lawns of the Quad and Memorial Stadium Green roofs. These images show primarily brown color schemes, during the dormant season, and at all scales.












Figure 4.06 - The bottom 10 images rated for visual appeal (Author, 2018).

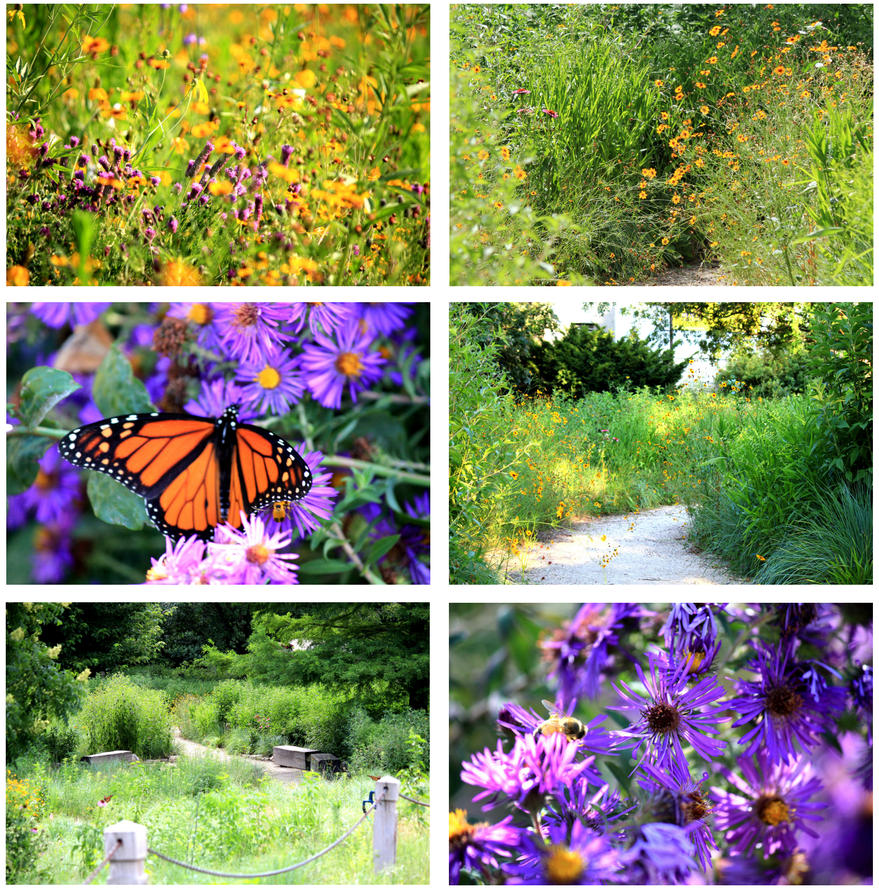


Figure 4.07 - The top 10 images rated for habitat quality (Author, 2018).

Image Ratings - High Habitat Quality

These images were rated with the highest perceived habitat quality for pollinators, and like the images rated for highest appeal show primarily the Meadow and the Memorial Stadium Green roofs, containing vibrant color, and including pollinators. However these images include one that are taken at a variety of scales, implying that scale has no real impact on perception of habitat quality.



Image Ratings - Low Habitat Quality

These were the images ranked lowest for habitat quality, and they primarily portray the Meadow and the Quad during the dormant season. These were viewed as particularly unhinhabitable for pollinators, showing up four times each out of the lowest ten ranked images. They each show a primarily brown color scheme, dormant plantings, at site-scale and no pollinators.













Figure 4.08 - The bottom 10 images rated for habitat quality (Author, 2018).

Short Answer

The short answer section of the survey shows an image of each of the study sites on the campus, representing each of the three styles of habitat sites. The responses to the short answer questions were coded using word trends. Answers were coded “Approval” if the respondent clearly stated that the image and the site were appealing to them and the response recieved a score of 100. Similarly, answers were coded “Disapproval” if the respondent clearly stated that the site was unappealing to them and the responce recieved a score of 0. If the respondent did not describe the site as appealing or unappealing, the response was coded as “Neutral” and recieved a score of 50. The average for all the image response scores were taken, and also the average approval rating, disapproval rating, and neutral rating. Each site image has an overall approval score, which determines what applies to the guidelines. The scores for each site are shown in the table on the right.

When respondents described what they liked and disliked about the sites, they would use certain words such as “natural” when describing an appealing naturalistic site. All of the words that were frequently repeated when describing site possitively and negatively were recorded as well. It would make for an interesting future research opportunity to see what words and phrasing individuals respond to when describing a site along with imagery of that site. Could different descriptive language change the influence of visual representations of a site?



Figure 4.09 - Short answer approval scores from visual preference survey (Author, 2018).

The Memorial Stadium

Average Score: 77%
Approval: 63.83% (30 of 47)
Neutral: 23.40% (11 of 47)
Disapproval: 12.77% (6 of 47)
Key Words Pros: Natural, Wildflowers, Meadow, Calm/Relaxing/Peaceful, Wild, Hike
Key Words Cons: Messy, Unkempt, Weedy, Overgrown, Neglected/Abandoned, Too many bugs

The Meadow

Average Score: 76%
Approval: 70.21% (33 of 47)
Neutral: 8.51% (4 of 47)
Disapproval: 21.28% (10 of 47)
Key Words Pros: Natural, Wildflowers, Meadow/Prairie, Calm/Relaxing/Peaceful, Wild, Hike, Seat, Shade
Key Words Cons: Messy, Unkempt, Weedy, Overgrown, Neglected/Abandoned, Too many bugs

The Quad

Average Score: 68%
Approval: 51.06% (24 of 47)
Neutral: 27.66% (13 of 47)
Disapproval: 21.28% (10 of 47)
Key Words Pros: Shade, Greenery, Academia, Manicured, Relaxing/Peaceful/Calm
Key Words Cons: Sterile, Unnatural, Structured, High-Maintenance, Bland



Figure 4.10 - Image of the Memorial Stadium green roofs used in the short answer section of the visual preference survey (Author, 2017).

Short Answer

"Very natural and peaceful. This setting doesn't appear to be imposed upon its surroundings. Just a nice chance to enjoy some greenery and flowers."
- Anonymous

The Memorial Stadium green roofs - Thirty out of forty-seven respondents found this site appealing, and gave it an overall score of 77% approval, the highest approval rating of the three short-response images. Almost all of the responses who found this site appealing enjoyed the bright colors and the wildflowers on the site. Many people described it as "calm" and "natural", and five people referred to the site as a "meadow". Seven people found the green color appealing, and seven also enjoyed the growing season, saying it reminded them of spring or summer time. Six people liked that there were flowers for pollinators to enjoy, and one person referred to the site as "healthy".

Six people found this site thoroughly unappealing, and eleven people replied neutrally, giving neither a definitive answer of approval. Three of the responses described the site as "unmowed weeds", "overgrown brush", and "poorly maintained". One person said that the site looked "lonely" and "abandoned". A few of the people who found the site unappealing stated their disapproval of the roofs being retrofit with a green roof, stating that they believed it compromised the integrity of the site. This raises an interesting question: How does a person's memory of a site influence their response to images of it?

Respondents who replied with neutral statements raised issues of allergens, and interaction with bees. Many people in this category recognize the benefits of habitat quality for pollinators, but state that they do not find it particularly appealing. A few of the neutral responses are neutral simply because of the lack of commentary they provide, such as: "very natural", "color, wildflowers", and simply "Meadow". Many of the neutral responses in the other

"This seems to be abandoned. I think it seems lonely."
- Anonymous

Short Answer

The Meadow - This image received the highest number of approval ratings, but still came in second overall because it also tied for the highest number of disapproval ratings. Thirty-three people found this site appealing, ten people found it unappealing, and four people were neutral. People who found this site appealing primarily described it as “natural” and “calm”, and people primarily liked the colors and flowers on the site. People liked to describe what they would do in the space, like hiking, sitting beneath the tree, or touching the flowers. One person even claimed they would take a nap in this space, despite the insects.

“I love that it’s more wild verses a more manicured garden. I love the beautiful flowers and the different shades of green. It makes me think of tranquility. To walk in this area would make you forget the worries of the world.”
- Anonymous

Of the ten individuals who found the site unappealing, the general consensus was that the detracting factor is the overgrown and unkempt appearance. Some people raised issues with perceived insect activity, stating that they would not want to spend time in the space if there were too many bees or stinging insects. Some people acknowledge the beneficial pollinator habitat, but would not want to spend time in the space because it is not comfortable for humans. Almost each response included the word “weed” in some form, implying that respondents believed this site to be neglected or uncared-for, despite the extensive maintenance program that the Meadow volunteers perform during every season. This shows that many people do not recognize the difference between harmful and unsightly weeds and native plant species.

The four neutral responses reiterate the main points from both the people who found the site appealing and those who found it unappealing: how it seems messy, but is peaceful, and provides habitat for pollinators.

“A little surprising to see this much nature in this setting. Looks a little weedy and overgrown. Might be a refreshing surprise, or it might be more like “Ugh! I have to walk through that?””
- Anonymous



Figure 4.11 - Image of the Meadow used in the short answer section of the visual preference survey (Author, 2017).



Figure 4.12 - Image of the Quad used in the short answer section of the visual preference survey (Author, 2018).

Short Answer

"Even though this picture has interesting lines and symmetry, I would not want to spend any time there. It makes me think of institutions, such as hospital grounds. It is sadly lacking color."
- Anonymous

The Quad - This image was tied for the most disapproving ratings, and had the lowest approval ratings, but came out on top when it came to neutral responses. The site received an overall approval score of 68%, the lowest of the three images. Of the twenty-four people who found it appealing, many of them described the site as orderly, found it calming, and enjoyed the greens and trees. Many respondents called the site "academic" or "scholarly", which implies that the manicured space implies the quality of life that accompanies a higher education. Some of the people who found this site appealing still believed it would be greatly improved with more color from blooms and provision of more pollinator habitat.

Like with the Memorial Stadium Green roofs, some respondents were familiar with the site and found it unappealing on principle, simply because it was the Quad and they did not like their memories of the site. Many of the other respondents found the site too orderly or "sterile", often calling it "unnatural". They felt that a landscape that was so manicured would inhibit a person's ability to use the space for fear of ruining the cleanliness of it. Maintenance was a common issue that respondents would mention - the implied annoyance of having to maintain such a manicured space and the time and effort it would absorb. Some people noted the concrete pathways and responded that they felt it encouraged movement through the space as opposed to lingering and enjoying that space itself.

"Sterile" was a frequently used word, and showed up seven times in each category of approval. The neutral responses often brought up the suggestion of including more plantings and color in the site. Many enjoyed the green space, but felt it was barren or empty of habitat and appealing plantings.

"The image above makes me feel like I'm on a college campus. I like all of the trees, and how perfect the grass seems to be cut. It makes me think of those months of transition between summer and fall. I think I would feel calm being in that location."
- Anonymous

Research Results

What visual elements can be used as communication tools by professionals in landscape architecture and ecological design to increase the understanding and appeal of pollinator spaces to the public?

Image factors like color, seasonality, scale, site, and presence of pollinators can be used in specific ways to inspire appeal and communicate habitat quality to an audience. Images that show the small details of a site, with vibrant colors, during verdant growing seasons, of various styles of sites, and showing pollinators generally inspire the most appeal and communicate the purpose of pollinator habitats to audience members.

However, these image factors are only a small sampling of an enormous vocabulary of visual cues and signs that could possibly communicate the same message. This research was conducted in a tight time line and did not delve into the intricacies of regional trends in interpretation, demographic differences, or possible expansions in memory-making and its connection to perception of sites.

Future explorations in this subject should disconnect sites from factors, providing a wide variety of sites and images so that individuals are less like to draw on personal connections to specific sites. Or, alternatively, tailor the survey to a specific site and people who will regularly interact with that site.

Another direction to explore is the trends of word association individuals attach to naturalistic spaces and pollinator habitats, and how similar those are to other styles of ecological landscapes. There may be patterns in how people view abandoned lands and ecological spaces, and that could have a negative impact on future efforts of restoration.



Figure 4.13 - Damselfly enjoying the dew on leaves after rain shower (Author, 2017).



REFLECTIONS

REFLECTIONS

Survey Findings

Many of the findings from conducting this survey followed along the hypotheses I developed: that individuals would find colorful images of close-up site details, during the growing season, and showing pollinators the most appealing. However I was very surprised to see how people responded to the habitat quality ratings and what people had to say about the naturalistic and semi-naturalistic sites. Many people with no ecological or conservation background could accurately identify pollinator habitats, but were typically individuals with gardening and agriculture experience, or lived in more rural communities. This might imply that individuals outside of the urban matrix have more familiarity with naturalistic landscape and can appreciate their function and visual aesthetic.

Images that received the highest ratings generally showed naturalistic and semi-naturalistic sites, at close-up and site scales, during the growing season, and showing a vibrant array of colors and pollinators. In contrast, the majority of images rated lowest for appeal and habitat quality showed naturalistic and manicured sites at various scales, during the dormant season, showing dull brown and gray colors, and without pollinators present. All images showing the dormant season, except for images showing fall color, were rated incredibly low for appeal and habitat quality. This raises and interesting question: why do people feel so adversely about dormancy? Some literature implies that individuals equate dormancy with failure to maintain a landscape and see it as a negative reflection on the person or institution responsible for care of the site. Another theory is that individuals do not recognize how the dormant season is part of the lifecycle of plants and landscape and a necessary part of a healthy environment.



Figure 5.01 - Image of coneflower protruding from native grasses (Author, 2017).



Figure 5.02 - Image of fallen leaves on rocks and grasses as the landscape enters the dormant season (Author, 2016).

Survey Findings

One of the surprising things from this was comparing the ratings of butterflies and bees, and finding that in general they had equal ratings, except for Monarch butterflies which received the highest ratings overall. This could be due to a number of factors, such as individual's inability to identify butterflies from moths unless they are brightly colored, or that Monarch butterflies are so marketed as "the native pollinator" that individuals are automatically drawn to them. It is fascinating since evolutionarily the bright color of the Monarch's wings are meant to ward off attackers by warning them of their poisonous nature, and yet people are attracted to them. Another thing that individuals found unappealing was the the obvious insertion of pollinators into an image where they were not naturally found. There was a small collection of images in the survey where pollinators were photoshopped into the image, and one in particular looked very obviously fake, and this image was the lowest rated pollinator image. It is obvious that individiuals enjoy seeing pollinators, but inserting them unnaturally into an image appears to be off-putting and unappealing.

Another trend noted was the intensity and divisive nature of responses from individuals who have personal experience with the depicted sites. Some individuals had very strong negative emotions about sites like the Quad or Memorial Stadium, while others had mixed opinions on the sites that had been retrofitted. It would be interesting to see if individuals would respond with less bias to images that they have no connection to, or if the responses from personal experience are more tailored to a site and should be sought after.

Overall, the finding of this survey tracked with my predictions, with a few very interesting surprises. If this research is expanded on in the future, I think that these general trends will stay true with a few demographic variations on views of pollinators and naturalistic landscapes.



GUIDELINES

GUIDELINES

Structure

This section is wholly devoted to delineating the proper use and effects of image factors within a design composition. A massive tool in the arsenal of designers is the ability to create visual representations of spaces that have yet to be implemented, both as a means of conveying the qualities of the space and to increase the appeal of the design to clients. This can be achieved in many variations – such as hand illustrations, computer renderings, three-dimensional models, digital models, and montages of photographs. Because the focus of this project is on the factors found in photographs and realistic images, these guidelines will apply primarily to photorealistic renderings, but they could very easily spill over into other styles of representation.

The rendering examples in this section show how to create perspecitve visuals for proposing site designs of pollinator habitats, but some of the artistic choices made were not dictated by the guidelines or the literature. Photomontage is one rendering strategy that I am very silled at, but was not part of the visual preference survey. Similarly, the use of illustrated humans and pollinators are a personal choice to show how people and pollinators can use the space without hindering the view of the site itself.

The following guidelines will be separated into two different strategies: guidelines that revolve around presenting a specific style of design (formal, semi-natural, and natural) and those that deal with generating original images for any style of design. These strategies tailor to the needs of the professional, whether they be implemented during the design phase or after. The guidelines themselves reflect on a specific image factor: scale, season, color, and pollinators. Scale refers to the scope of subject in a generated image, whether it shows an entire site, a view within the site, or a specific feature that is important to the design. The season of the image can show the prominent appeal of growing or dormant season designs and is heavily influenced by color. Greens and browns are often what comes to mind when picturing the color palette of landscapes, along with a wide variety of colors from blooms and autumn foliage. The communication of habitat quality in any given site is greatly influenced by the visual presence of pollinators, whether butterflies or bees. These factors determine what impact an image can have on an audience and can further the effect of a design proposal on an audience. Below are the strategies for how to use these guidelines in the creation of future design visuals:



Figure 5.01 - (above) Comparison of photograph butterfly vs. sketch (Author, 2018).

Table 5.01 - Table of guidelines (Author, 2018).

Guidelines for Perspective Renderings of Pollinator

Image Factor	*General application*	*Site-specific application*
Scale	Show close-up site scale images; these show the details of the site, materials, insects, and plants. If using a larger scale, be sure to include context of the site to provide orientation.	**Manicured:** Show the whole site and surrounding context. This shows the structural details of the site design.
		Semi-Naturalistic: Show the close-up site details, and also the architectural elements.
		Naturalistic: Show the close-up site details, especially blooms and foliage.
Season	Show the growing season. The growing season covers any time when the plant material of the site is verdant or blooming.	**Manicured:** Show the site during the growing season or the dormant season, so long as there is an abundance of color.
		Semi-Naturalistic: Show the site during the growing season for visual appeal, and the dormant season for habitat quality.
		Naturalistic: Show the site during the growing season only, avoid the dormant season.
Color	Show a wide variety of bright color. Some green is good to show if it is highlighting some textural detail of the site. Color can come from foliage, blooms, materials, or animals.	**Manicured:** Show a variety of bright colors, from bright greens to vibrant autumn color.
		Semi-Naturalistic: Show a variety of color, expecially blooms of flowers.
		Naturalistic: Show a variety of vibrant colors and use greens to show interesting textures in plant material.
Pollinators	Show pollinators at every opportunity using the site. Butterflies and bees are the most common to show, especially near flowers.	**Manicured:** Show pollinators to increase perception of habitat quality, leave out to increase visual appeal.
		Semi-Naturalistic: Show pollinators to increase perception of habitat quality, leave out to increase visual appeal.
		Naturalistic: Show with or without pollinators, appeal and habitat quality are not affected by presence of pollinators.



General Application

When creating perspective visuals...

Scale – Show site features prominently to communicate the details of a design, and when showing the site at larger scales be sure to include some context of the site.

Season – Show the growing season, which inspires appeal in an audience, while the dormant season communicates the presence of habitat so long as color variety is still present.

Color – Show a wide variety of bright colors, especially from blooms. A green color scheme can be appealing and imply habitat quality if implemented with high contrast. Browns were very poorly received overall but did have an impact on communicating habitat.

Pollinators – Show pollinators; pollinators on flowers, pollinators in the air, pollinators resting on material elements of the site, pollinators everywhere! Viewers generally enjoy seeing bees, and love seeing monarch butterflies.

Figure 5.02 - Digital rendering of bioswale plantings (Author, 2018).

Site-Specific

When presenting a specific style of site design:

A formal site design – characterized by wide lawns, shaped hedges and plantings, non-native plantings, formals lines and clean edges.

Scale of the site
Show the whole site, including some of the surrounding context.
Season
Show the site during the growing and dormant season (especially fall color).
Color
Show a variety of colors – bright greens and vibrant blooms during growing season and autumn colors during dormant season – but avoid browns entirely.
Pollinators
Showing pollinators in the site improves the perceived habitat quality, though it does not imply high habitat quality compared to naturalistic sites.

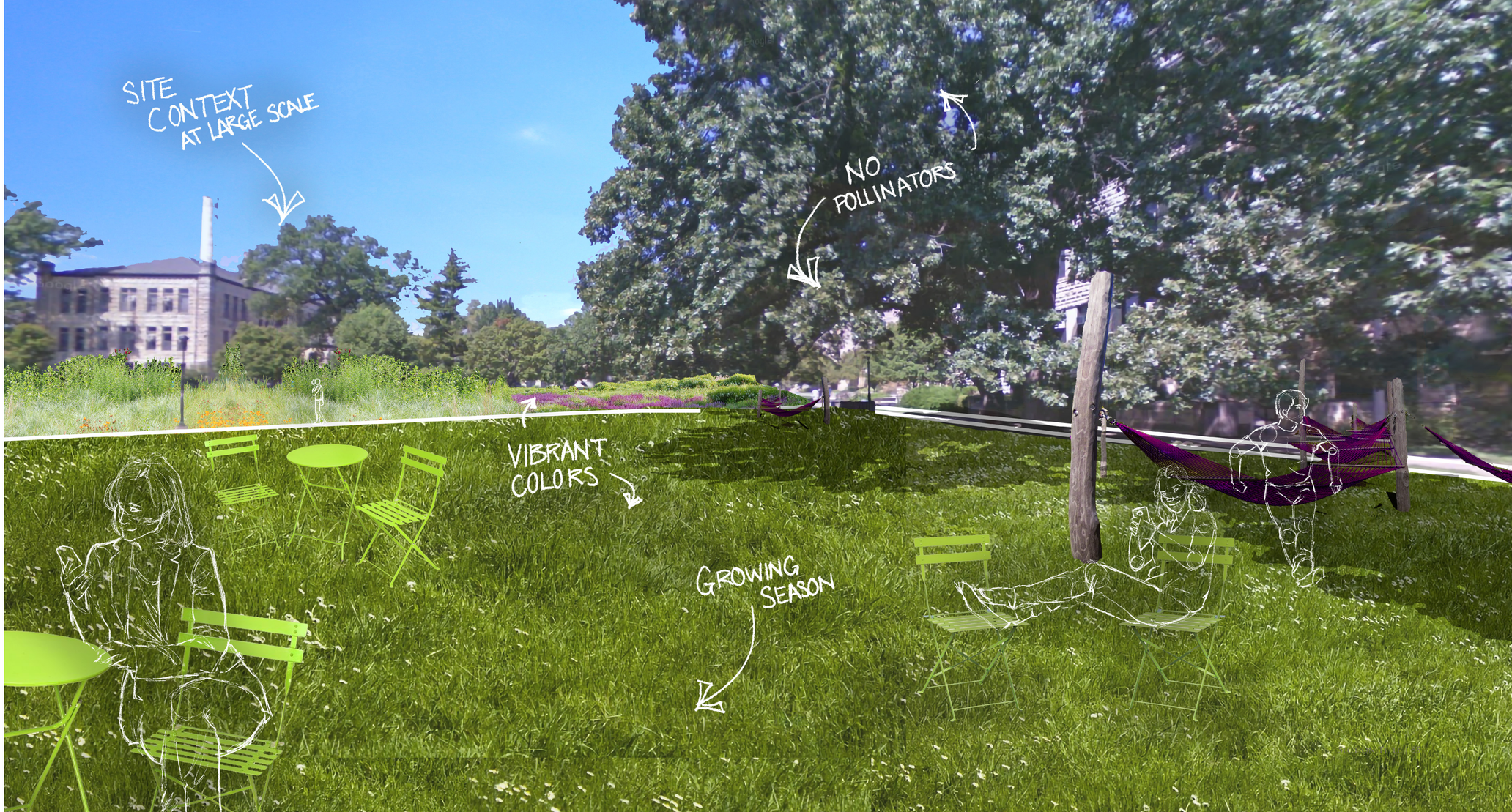


Figure 5.03 - Digital rendering of a manicured site with sketched figures (Author, 2018).



Site-Specific

A semi-naturalistic site design – characterized by native plants, structural or architectural surroundings, often highly engineered. When presenting a site like this, be sure to emphasize the designed portions so that viewers do not confuse designed naturalism as abandoned structure. Viewers generally found sites like this to be calming and meadow-like, so be sure to use those key words in a presentation.

Scale of the site
Show site features – the details are more appealing than the site as a whole, but also include some of the architectural elements as well
Season
Show the site during the growing season for visual appeal and show during the dormant season for habitat quality (especially fall color).
Color
Show a variety of color – from both blooms and vegetation color.
Pollinators
Show without pollinators to improve appeal, and with pollinators to improve perceived habitat quality.

Figure 5.04 - Digital rendering of a semi-naturalistic site with sketched figures (Author, 2018).

GUIDELINES

Site-Specific

A highly naturalistic design – characterized by native plants maintained in a way that provides habitat and ecological health, often wild or unkempt-looking despite constant maintenance. Avoid images that look too busy or cluttered as these sites are generally seen as messy, and be sure to also emphasize the natural qualities of the site – remind the audience that natural sites are peaceful and healthful.

Scale of the Site
Show site features, similarly to semi-naturalistic sites
Season
Show the growing season prominently, dormant season is often viewed as messy or abandoned.
Color
Show a variety of color if color is the subject of the picture, use green when texture is more important (ex. Color of flowers or butterflies vs. texture of grasses)
Pollinators
Show with and without pollinators, habitat quality and appeal were not greatly affected either way.



Figure 5.05 - Digital rendering of a naturalistic site with sketched figures (Author, 2018).

CONCLUSIONS



CONCLUSIONS

Summary of Research

Pollinators are vital to maintaining our ecosystems, our environmental balances, and human health on an enormous scale. We rely so heavily on pollinators, not only for much of our food supply, but also for sustaining the populations of our favorite plants and flowers. As our cities and agriculture centers grow, less and less habitat remains to support pollinator populations, both wild and domestic. To ensure that these species stay with us and continue to provide the crucial services we rely on we will need to begin installing pollinator habitats within our own human ecosystems. In the past, urban ecological landscapes have been criticized for being weedy, messy, and generally unappealing due to their non-manicured appearance, and proposals containing ecological designs are often harder to implement with public support. If there was a way to present ecological habitat spaces in an appealing way and in a way that communicated their purpose as habitat, public opinion of such spaces might improve and increase the chances of these landscape being installed in urban areas. This report delves into the intricacies of visual languages, image factors within photographs, and the creation of a set of guidelines that will help future designers and landscape architects achieve this goal with their proposals of ecological habitat spaces.

What visual elements can be used as communication tools by professionals in landscape architecture and ecological design to increase the understanding and appeal of pollinator spaces to the public?

From conducting a visual preference survey among a small sampling of participants found that individuals found images with the following factors to be most appealing, and to communicate the best quality of pollinator habitat:

Vibrant colors
Close-ups of site details
Growing season
Pollinators present
Naturalistic and semi-naturalistic sites.

These results lead to the creation of a set of guidelines that designers and landscape architects can apply to the creation of presentation images, primarily perspective renderings that communicate the detailed qualities of a design.

A conceptual site design for the Quad site was created to illustrate how to utilize these guidelines in the design process. This site contains the habitat needs for pollinators like bees and butterflies, but also exhibits traits of ecological site design like storm water management on site and a sustainable maintenance plan. This design is entirely educated by extensive literature in the field of ecological design and designed habitats.

The structure of the guidelines presents a set of over arching guides that apply to any kind of site design that contains habitat, and also breaks down into the various styles of ecological site design (manicured, semi-naturalistic, and naturalistic). This makes the guidelines very flexible, but capable of applying to more specific design situations.



Figure 6.01 - Last bloom (Author, 2017).



Figure 6.02 - Starblazer trio, Memorial Stadium green roofs (Author, 2017).

Reflections

The work done in this research - from collecting images of beautiful ecological landscapes to creating a survey and developing guidelines to assist others in the future - was all the work of passion. My personal passion for pollinators and for creating appealing works of design and artistry was imbedded in every aspect of this work, and as I write this reflection I see many things I wish I had time to further investigate despite my immense satisfaction with the research process and discoveries that have come from it.

Looking back on this project, I see now how ambitious the visual preference survey was structurally and how limited I was in my strategy for sampling. The sample itself is biased, due to the personal relationships I have the majority of survey-takers. A trend was also observed where individuals with personal connections to the shown sites had much more dramatic responses to those sites than individuals with no personal connection. Memory of a space seems to have a major impact on appeal, and this should be explored further in the context of appeal and habitat quality. A future survey could be targeted at a specific area, and show images people would recognize and feel a stronger opinion for. This would also solve this issue of trying to collect a large, random sample by finding results specifically for a population that a site is intended for. There were also some interesting trends seen in the demographics of the people who took this survey, with almost a quarter of respondents coming from the healthcare industry, and those individuals providing the highest ratings for naturalistic landscapes across the board. It would be incredibly interesting to see if other trends in demographics arose in a larger scale survey. I was incredibly surprised and pleased to see that people rated bees and butterflies as equally appealing in an image. Monarch butterflies were still a favorite of course, but bumble bees and honey bees were still incredibly well received. That gives me hope that the stigma against bees might be lifting slowly, and that would make a huge difference in raising advocacy for pollinator habitats.

The guidelines themselves are very similar in their final form to what I had thought they might be. All of the factors that the guidelines emphasize can be seen in the illustrated graphics provided as examples of implementing guidelines in design practice, however a few of the characteristics of those images are not supported by the guidelines. The use of photomontage and digital rendering are implemented despite the survey using only photographs and images of real, implemented sites. These renderings also include illustrated sketches of people and pollinators inhabiting the space, which breaks the sense of realism and has no backing from the guidelines themselves. These were personal artistic choices that I implemented to emphasize the point that these rendering were examples of one way to use the guidelines, and not set-in-stone recommendation for designers to follow to the letter.

I would love to see any future development of this study on visual language delve more into the intricacies of site structure, like material use, what specific periods of dormancy individuals find especially unappealing, what types of plant materials people are most drawn to, or even how well individuals can identify pollinator habitat structures in a site. There are so many directions future research could take this study, and I thin it would be fascinating to see how visual language evolves in the design profession in the future.



APPENDIX

APPENDIX - A

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APPENDIX - B

Qualtrics Survey

Worth a thousand words: The impact of images on the perception of pollinator habitat - Sarah Jackman

Intro & Informed Consent



Did you know that 1 in 3 bites of food you take everyday is provided through the act of pollination? (1) Pollination is the essential process for flowering plants to reproduce, and is key in the development of fruits, vegetables, and many other food products like honey. Pollination is performed in a number of ways: sometimes the wind carries pollen through the air and it lands on other plants; other times the role of pollen-carrier falls onto animals like bugs, birds, and bats. Animal pollinators are responsible for 35% of food production globally, and is estimated to contribute $24 billion in pollination services to the agriculture industry (1). Most pollinators - like flies and beetles - can live just about anywhere and feed on anything; however, specialized pollinators - like wild bees, butterflies, and bats - depend on specific habitat features to survive. Pollinator habitats need to provide a few important features: food (pollen and nectar from flowers), water, and shelter (loose soil, reedy plants, leaves). You may have seen a recent rise in butterfly gardens, or pollinator spaces in neighborhoods, parks, or along roadways; these spaces are designed to provide food and shelter for small specialized insects who pollinate our flowers and crops.

The purpose of this study is to better understand people's perceptions of pollinator habitats through photographic images. Design professionals can use the findings to better create pollinator habitats for people to enjoy and pollinators to thrive. This survey is a visual preference survey. You will be shown a series of images and asked to rate each of them individually for your preference. You do not need to provide any reasoning or explanation for your preference, only your honest opinion of each image presented. Your choices will help us learn more about what you find beautiful in images of gardens and outdoor spaces that could potentially provide habitat for pollinators, and this will help us design better pollinator habitats in the future.

1. "Fact Sheet: The Economic Challenge Posed by Declining Pollinator Populations." 2014. *Whitehouse.gov*. June 20. https://www.whitehouse.gov/the-press-office/2014/06/20/fact-sheet-economic-challenge-posed-declining-pollinator-populations.

By continuing this survey you are consenting to participate in research. The findings from this survey will be used collectively, and responses cannot be traced back to the individual. Participants may withdraw at any time without penalty. There are no direct risks or benefits to participating in this survey. Results of this survey will be freely available through Kansas State University Research Exchange (https://krex.k-state.edu/dspace/) upon completion of this project.

This survey will take about 20 minutes to complete.

If you have any questions please contact:
Graduate Student: Sarah Jackman - sm140@ksu.edu
Principle Investigator: Blake Belanger - belanger@ksu.edu
Kansas State University IRB Committee Chair: Rick Scheidt - rscheidt@ksu.edu

In the section below, please provide some demographic information before continuing on to the next page. Thank you!

Please put your age below:

Gender

- Female
- Male
- Other
- Undisclosed

In what country and state/province do you currently live?

What is your vocational/professional field and/or educational background?

List any gardening or horticultural experience you may have below:

Image Preference Ratings

You will now be shown a series of images followed by a couple questions. For each image you will rate its beauty AND habitat quality. The images you will be shown display a variety of color, various seasons, different scales, and different pollinator species in three different campus sites (a stadium green roof retrofit, a naturalistic meadow-like garden, and a traditional lawn on a campus). Beauty can be anything you find appealing - colors, plants, lighting, etc - so feel free to be honest with your answers. Keep in mind that good pollinator habitats provide food and shelter for pollinators.



Rate the image above on how beautiful or appealing you find it, and then rate it again for how well you think it provides habitat (food and shelter) for pollinators.

Low 0 10 20 30 40 50 60 70 80 90 100 High

Beauty/Appeal

Habitat Quality



Rate the image above on how beautiful or appealing you find it, and then rate it again for how well you think it provides habitat (food and shelter) for pollinators.

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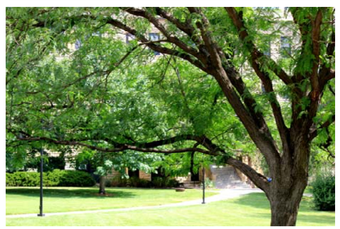


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Qualtrics Survey

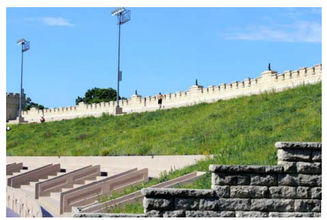


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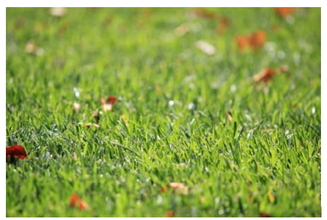


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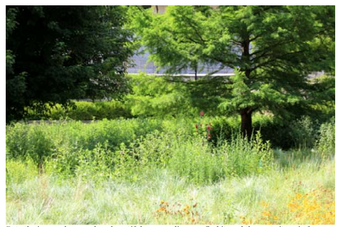


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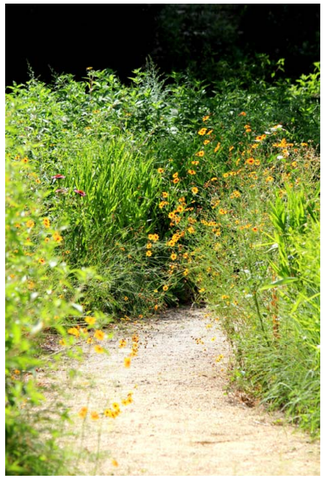


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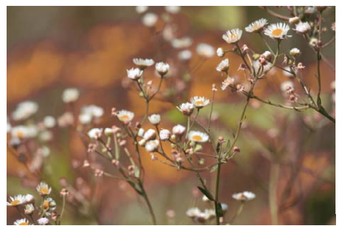


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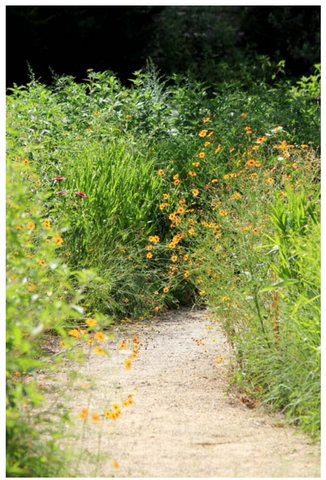
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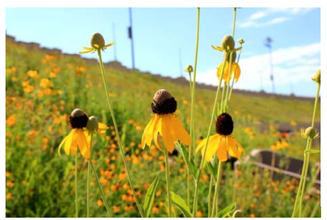
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Beauty/Appeal

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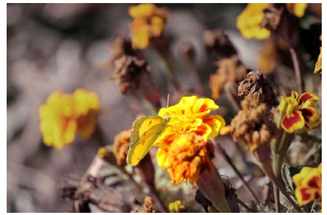


Rate the image above on how beautiful or appealing you find it, and then rate it again for how well you think it provides habitat (food and shelter) for pollinators.

Low High
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Beauty/Appeal

Habitat Quality

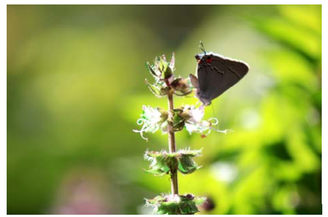


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Qualtrics Survey



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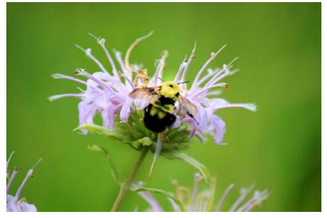


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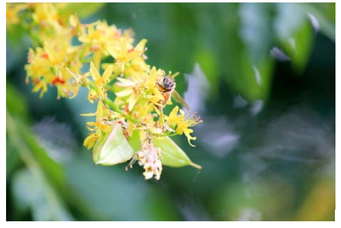


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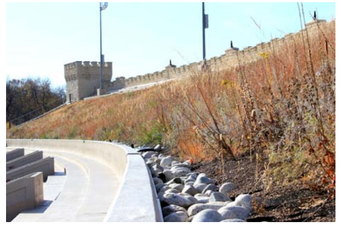


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Beauty/Appeal

Habitat Quality

Qualtrics Survey



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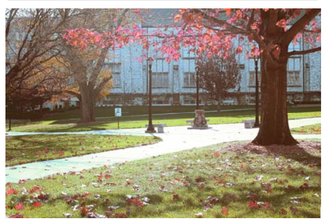


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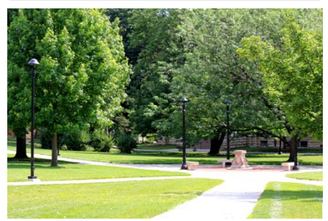


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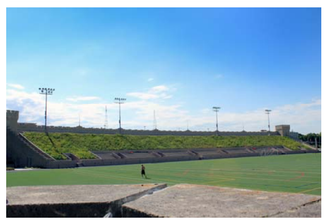


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Beauty/Appeal

Habitat Quality



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Ugly/Poor habitability Beautiful/Very habitable
0 10 20 30 40 50 60 70 80 90 100

Beauty/Appeal

Habitat Quality

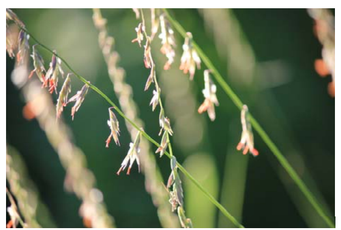


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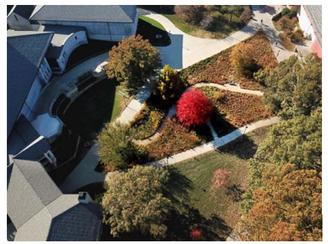


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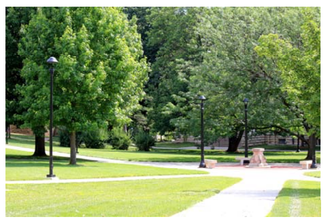
Short Answer



Briefly describe how you feel about the image above. What do you like or dislike about it? What does it make you think of? How would you feel if you were in the location depicted?



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Department of Architecture, Planning, and Design - Kansas State University

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APPENDIX - C

Ratings & Responses

		Sites						Scale						Season				Colors						Pollinators Present			
		Memorial Stadium		The Meadow		The Quad		Whole Site		Inside Site		Features		Growing		Dormant		Variety		Green		Brown		Yes		No	
		Appeal	Habitat	Appeal	Habitat	Appeal	Habitat	Appeal	Habitat	Appeal	Habitat	Appeal	Habitat	Appeal	Habitat	Appeal	Habitat	Appeal	Habitat	Appeal	Habitat	Appeal	Habitat	Appeal	Habitat	Appeal	Habitat
Sites	Memorial Stadium																										
	The Meadow																										
	The Quad																										
Scale	Whole Site	42	32	59	49	73	46																				
	Inside Site	45	52	52	60	57	37																				
	Features	75	73	61	60	66	50																				
Season	Growing	43	38	77	85	65	48	74	81	64	44	73	77														
	Dormant	40	45	31	36	64	38	50	34	31	30	37	38														
Colors	Variety	81	85	78	85	69	44	67	78	76	85	83	88	68	77	51	57										
	Green	49	54	65	70	56	44	39	37	69	46	58	45	61	57	38	28										
	Brown	46	48	44	41	21	20	27	29	23	25	61	43	57	50	41	50										
Pollinators Present	Yes	77	82	76	78	79	81	73	86	65	50	89	87	86	86	74	73	87	85	64	72	65	67				
	No	76	81	75	86	62	45	47	50	77	87	82	77	83	84	66	73	80	79	61	51	65	71				

1 Highest Rating

2

3

4

5 Lowest Rating



Demographic Data					Memorial Stadium Green roofs	The Meadow	The Quad
Please put your age below:	Gender	List of Countries	What is your vocational/professional field and/or educational background?	List any gardening or horticultural experience you may have below:	Briefly describe how you feel about the image above. What do you like or dislike about it? What does it make you think of? How would you feel if you were in the location depicted?	Briefly describe how you feel about the image above. What do you like or dislike about it? What does it make you think of? How would you feel if you were in the location depicted?	Briefly describe how you feel about the image above. What do you like or dislike about it? What does it make you think of? How would you feel if you were in the location depicted?
25	1	USA, Kansas	Graduate Student	Basic gardening skills	I think this image is very pretty. There is clearly some plant diversity, which I like. It makes me think that they are all wildflowers- which they may be. I like that it's near a building. I would be happy to see it, rather than non-native plants, if I were in that location.	I really like the abundance of flowers and plant growth. It looks to me like it's an area with only wildflowers (probably near the Beach Museum?) It looks more natural and makes me think of prairies. I would be very happy if I were walking through that area.	This image looks ok to me. It looks like your standard lawn with cut grass and a few strategically placed trees. I don't particularly like or dislike anything about it. I wish there were more plants and flowers.
22	2	United States of America, Kansas	Graduate Student, Chemistry	N/A	Nice springtime bloom, calming, possible allergies from pollen.	A great place to read with the old tree and blooming flowers	Calming with nice shade, pretty greenery, not does not look like there is much for pollinators.
20	2	Kansas	Mechanical Engineering	Garden club member senior year of high school	The bright colors make this area appealing. However, the placement of this habitat in the old stadium seating strikes me as odd. When the plants are dormant or lose their color in the winter, the stadium looks poorly maintained even though that may not be the case. The lack of trees or bushier plants make the patches of grass and flowers less varied and also less appealing.	The flower patches mixed in with the tall grasses makes it seem like almost a natural habitat. The pathway and seating is inviting for people in a way that doesn't distrub the wildlife. The scenery makes me feel at peace.	The trees in the quad are beautiful and it's a nice area to walk through generally, but the babitat could be improved for pollinators. I think there is room for patches of flowers/grassy areas interspersed, as a lot of the open space is avoided or unused.
24	2	United States, Kansas	Undergraduate Student	Helped care for a greenhouse at KSU for 2 months	I like the sloped terrain, it makes me think of sitting and watching k state games back when there was grass next to the stands at bill snyder stadium. The plants look soft to sit on.	I dislike tall grass, because there are usually insects swarming in there. But if you're into that, I guess it's pretty cool. If I were an insect, I'd be all like "hey, that's some prime real estate right there." But I am a person and not an insect.	It reminds me of my first few years at KSU, and makes me feel reminiscent of english classes sitting out in the quad. I like the depth of the image, and the verdant trees in the background are cheerful. Like a bob ross tree. Exactly like a bob ross tree.
23	2	USA Kansas	Student Sciences	none	To an untrained individual these look like wild flowers in healthy condition in a great spot. There's nothing to not love about this.	It reminds me of walking on a dirt path in the plains of Kansas to a creek nearby. The rocks placed around, and the wooden log for a bench are great additions to the natural feel of the area.	I like the trees and the open area, but it does seem unnaturally constructed. There are no plants to look at and to make the area nicer, just trees and grass. Since this is in Kansas, and the school is an agricultural school it would make sense for there to be more native Kansas flora on campus, but instead we get mostly grass.
33	2	USA KANSAS	SALES/BS in Marketing	keeping plants alive on the property and planting new trees.	The flowers are pretty, but the rest is just overgrown brush all mixed together.	Looks nature-esque, but also cluttered and unkept. Seems busy.	relaxing and peaceful. I like the mature trees and varieties of them, the manicured grass, and the light fixtures.
31	2	Hong Kong	Engineering	Garden as child and potted plants at current residence	Natural, local, calm, spring I like that it shows nature integrated with our built environment. Additionally that it is green and thriving... Winter is over! I'd feel relaxed if there.	Again I like the natural feel of it where it's been allowed to grow as it likes but that there is a way for us to enjoy it in the trail and seat. I can imagine going on a walk down this path and taking a nice break at the seat. I can't. Imagine myself physically there.	It's organized and cultivated but ultimately seems like just a path through. There is little shade, ground foliage, or color and I can imagine not a preferred walkway in the heat of summer. The big trees are fantastic though. More if them and perhaps ones that bloom.
45	2	Colorado	Engineering	Vegetable gardens	Very natural and peaceful. This setting doesn't appear to be imposed upon its surroundings. Just a nice chance to enjoy some greenery and flowers.	A little surprising to see this much nature in this setting. Looks a little weedy and overgrown. Might be a refreshing surprise, or it might be more like "Ugh! I have to walk through that?"	It's an orderly well-behaved space, very functional. Makes me think about getting to where I'm going.
41	1	New York, USA	Engineer	Amateur gardener	Meadow	In the weeds	Well manicured, calming
43	1	Kansas, USA	Teacher, master's degree	Backyard vegetable garden	This seems to be abandoned. I think it seems lonely.	It seems overgrown and neglected.	It reminds me of college. I'd feel happy if I were there.
30	1	USA, TX	Nursing; BSN	None	Pretty, like the various flowers. nice hill.	Pretty path. Like the wild flowers. Like the wooden bench and how natural it fits in this surrounding. Looks like the path offers some shade around the corner. Also peaceful feeling.	Love the clean lines and greenery. Very peaceful feeling. Reminds me of a college campus. Well maintained.

Ratings & Responses

66	1	New Hampshire, USA	Medical: BSN Nursing	home gardener for 40 years	I like the green color. I love the splattering of flowers throughout. Makes me think of a summer day.... meadow-like. Expect to see bees on the flowers. Makes me feel relaxed and eager to breath the fresh air.	I like the setting, the colors of the flowers and winding path. Makes me want to go walk the path and see what is around the bend and/or sit on the bench. Reminds me of a summer day. I would feel relaxed in the setting and meander down the path.	I like the green. Makes me think of going to classes. Structured setting. In that setting I would feel like I had to hurry up to get somewhere !
58	1	Texas	Professional	Vegetables	Makes me think of a meadow to walk barefoot	Unkempt but peaceful	Manicured but sterile
38	1	Newfoundland, Canada	Some university Restaurant General Manager	Home gardening off and on for 20 years	This area makes me want to take my shoes off and relax with the different flowers. I'm sure that I wouldn't be able to resist picking one and studying it under the sun. I like how relaxed this area feels.	I enjoy how random and wild the above area is, it doesn't look landscaped or overly planned. The area makes me think of relaxing on a lazy summer day. If I were in the location I would feel warm, comfortable and relaxed.	The above area looks very well maintained and I am sure that it must smell of freshly mowed grass. I am less drawn to this image compared to the area with the wildflowers. Although it is a very nice area it feels very planned and busy. I would be less likely to sit and relax in this area.
54	1	United states	Consultant	Basic gardening	I love the colors and contours. I think it needs more variation in heights. I eiuld feel somewhat exposed in this space	I like the lack of order-not controlled. I would feel creative and more free in this soace	Very pretty but very plain and sterile. I would feel very safe and somewhat bored
40	2	Ohio	Law	Zero	Unmowed weeds. Neutral.	Unmowed weeds, albeit pretty ones. Itchy.	A college green. Scholarly.
29	2	USA, Texas	IT Consultant, Bachelors of Business Administration from TCU Neeley School of Business	Limited keeping of house plants	I feel like it is a peaceful meadow of flowers, and it makes me think of spring blooms along the highways. I'd feel serene if I were in the location depicted.	I feel focused as the image makes me think of hiking. I like the pretty flowers surrounding the path and the wooden bench along the trail. I would feel re-energized if I were in this location.	It reminds me of my time on a college campus and brings up fond memories for that reason. I'd feel inspired to study on the lawns.

59	1	USA Kansas	Homemaker	I worked in a landscape Garden Center for four years. Two of the four years, I was the tropical house manager where I grew all the flowering garden plants that were sold in the spring. I also ordered all the house plants in the tropical center and created flowering baskets and pots. I also was in sales and sold trees, bushes, and shrubs to customers.	It looks like a grassy slope. It does not entice my mind to think of anything and I would not look to take time in this location.	I don't care much for Grassy plants. When I look at the picture I think I am looking at weeds. If I was on a walk. I probably would not pick that location to sit and rest.	I do like being in an area with a lot of trees. I do feel peaceful and like to hear chattering birds when surrounded by trees. This location would make me feel peaceful.
59	1	Texas	nursing education	flower gardening vegetable gardening xeroscape back yard (attempt)	i enjoy the flowers and sunshine. it feels like summer time	i find this peaceful and quiet. i would enjoy a walk in the area. i would expect to hear/see many insects and wildlife	academic area - it's quiet now but many people would pass through. another enjoyable walk
69	2	Texas, USA	Retired communications worker	DYI vegetable gardening	Somewhat pretty. Kinda weedy. You definitely feel like you are in a natural setting.	Weedy, unkept. Looks like you are out in country and you may see many things crawling around here.	High maintenance area.
77 years old	1	USA Kansas	Retired RN Associate Degree	Family vegetable garden and flower gardens	I like this image. It is restful and reminds me of the prairie flowers and grasses in meadows where the sod has never been plowed.	This picture invites me in... warm colors and a casual setting. The hard rocks and bench seating does seem out of place in an otherwise pleasant area.	Even though this picture has interesting lines and symmetry, I would not want to spend any time there It makes me think of institutions, such as hospital grounds. It is sadly lacking color.
37	2	USA	healthcare administration	natural/native landscaping enthusiast	fresh, inviting	Natural, inviting, native, relaxing	manicured, sterile, organized, not want to linger
47	1	Texas USA	Nursing	None	I love the wild flowers. Otherwise there's nothing else pops out.	I love that it's more wild verses a more manicured garden. I love the beautiful flowers and the different shades of green. It makes me think of tranquility. To walk in this area would make you forget the worries of the world.	I feel that this is a pleasant walk area of a university campus. Very manicured and neat. Would be nice to have some pops of color or different textures.

28	1	Dallas, TX, USA	Project Assistant for Healthcare sector at CallisonRTKL High school diploma, almost completed an Associates in Arts	I have an herb garden at home that includes: oregano, rosemary, basil and mint. I grew a tomato plant this last summer that did very well. My boyfriend and I love to pot and plant cacti and other succulents. I tried to grow sunflowers this past summer as well but was a little too late in the season.	I like the image, and appreciate all of the greenery depicted. It reminds me of an open field and wildflowers in the spring. If I were in that location, I think it would make me feel pleasant, and thankful.	This image sort of reminds me of a hiking trail. I like all of the flowers and the feeling of being outside on a nature hike.	The image above makes me feel like I'm on a college campus. I like all of the trees, and how perfect the grass seems to be cut. It makes me think of those months of transition between summer and fall. I think I would feel calm being in that location.
66	1	TEXAS	RN, HOPSTIAL ADMINISTRATION, CONSULTANT HEALTHCARE	NONE	Neutral feeling nothing I dislike looks like a green space with flowers that may have bees Neutral	Appealing space, lots of green with some colored plants. do not dislike anything it looks like a nice path to a destination Feel comfortable	Nice walking path Open space feel secure Not enough color although this could be a result of the season that this picture was taken
55	1	Texas, USA	Nursing/Healthcare Bachelor of Science in Nursing and Executive MBA	Primarily suburban yard work but also familiar with hay fields in rural settings	Interesting - like the contrast and un-manicured look. Reminds me of an open, uncultivated field in the counrty	Like the path - draws me in and makes me want to wander. Prefer the natural unfinished edges and he bench for sitting and reflecting. Peaceful.	Love the trees. Reminds me of a university campus.
73	1	USA, Kansas	teacher, Masters	4-H gardner as youth, parents had a 50'x50' garden and fruit trees, grow container garden now, multiple houseplants, farmed for 13 years-oats, wheat, corn, milo, cattle and hogs.	Looks inviting. Might want to stop and study the activity in the area among the insects and enjoy the beauty of the flowers.	I'd like to go down that path and see what other treats there are in grasses, flowers and insects.	Looks fresh and crisp, but not inviting.
51	1	Texas, USA	Hospital Administration, Masters	Annuals, container plants Recently planted perennials - successfully, grew back in following year.	very natural	looks naturally beautiful But, unkept.	Beautiful and manicured.

60	2	US Texas	Architecture	I do garden and lawn maintenance at my home. Growing up, i helped my father with vegetable gardens and fruit trees.	color, wildflowers	natural, some wildness, but not out of control. Going for a short hike	formal, manicured, peaceful. resting, walking, having a conversation with a friend
47	1	Texas	Bachelors degreed - healthcare industry	organic gardening at home	I like the different colors and variation I think I would feel close to nature if I was here	Natural I like the variation I would feel happy here	It is too manicured Makes me think of a lot of maintenance and watering I think I would hear a lot of noise there
71	1	California USA	MA in speech communication; MA in school administration	Hobby gardening	Pleasing, natural, healthy. I like the inclusion of flowers. It makes me think of farms. I might be worried about bee stings	Natural thoughtful romantic isolated. I like the organic nature of the landscaping. A good Place to think and read and walk with friends.	Formal, geometric, well-maintained, semi sterile. It makes me think of my college campus. It makes me feel very organized. It looks like it could handle a lot of foot traffic
72	1	Kansas	Retired - Business school graduate	We have a vegetable garden each year. Have a few fruit trees (they usually freeze in the spring before they have a chance to bear fruit). We do have a few honey bees and bumblebees in our area.	I know this is the habitat in the stadium. It's ok for what it's intended for, but it's not my idea of great beauty! Trying to create habitat for insects is an admirable goal. We need to keep our bees, lady bugs, etc. alive and well. If planting grass and wild flowers above the stadium seating accomplishes that goal, I'm all for it.	I like the wildflower look. It's more conducive to insects and other wildlife than the manicured grass in some of the pictures. I would like to follow the path to see where it leads.	It's a nice campus shot. I'm not big on building pictures, but the green space is nice. Don't think there is much habitat in the closely cut grass though. Maybe caterpillars can chew some of the tree leaves, if they're not sprayed. It looks like a relaxing space to rest and study.
62	1	TX, USA	Healthcare, Retired MHA	Vegetable gardening, rose gardens, landscaping home.	Colors: variety of greens,flowers.	Like the chores: soft greens, beautiful flowers. Very calming.	Too formal, structured, too many sharp angles.
59	1	USA Kansas	B.S. in Agriculture with a major in Horticulture	13 years in the Nursery business 36 years as a gardener	It's nice. I like the wildflowers. It makes me think of sitting on the slope and relaxing. If I were there I think I would be calm and relaxed.	I like the wildness of this image. It makes me feel like I'm on a hike in the woods.	Very manicured and tidy landscape makes me feel less relaxed. I like the trees and the large canopies they provide. All the sidewalks look like a highway cloverleaf. If I were there I would either be sitting on a bench or be in a hurry to go somewhere.

Ratings & Responses

37	1	TX	BA in Illustration. Currently a Garden Education Specialist for a 501c3 non-profit in TX, former urban farmer	Urban farmer, gardener, farm intern, farm intern manager, farm worker, garden worker, garden educator	I like that there are wild flowers planted to help prevent erosion, water runoff and provide food for pollinators. Pictures of wildflowers conjur images of country fields or rural areas or nature centers/botanical gardens. It makes me feel joyful, warm and full.	This image reminds me of walking through a national park or nature center. The mixture of textures is playful, whimsical, peaceful and natural. I like that there is a bench for an individual to stop and observe all that is happening in the space, to reflect on the environment around them or to quite their inner thoughts.	I like that there are trees, but it's unfortunate that there aren't other plants planted near or around the trees for the tree's benefit, to add more color into the landscape and to make the space more visually appealing. It would be a nice area to walk through, but not necessarily a place I want to stop and absorb the environment around me.
28	2	'Murica	Makin' Money	My tomato plants died.	Old stadium turned into a farce. How could you destroy a piece of history like that?	That would be a good place to take a nap.	The quad at KSU. I'd feel like I'm too old to be back at college.
31	1	Georgia, United States	BS International Business Intelligence Analysis	Hobby gardening	I like the pretty flowers and that there are multiple colors. It's not brown, fairly green. The brick wall in the background kind of ruins it though...	I like the tree and grasses, but it's nothing beautiful or special. It would be better if it had more flowers and more colors. I would feel fine being there, but it's not very peaceful or exciting because it's in sight of the building. But is a decent place for pollinators.	I think that the lawn is nice but it doesn't have much color to it besides green. I think the only pollinators that would go there would be birds in the trees. It looks clean and crisp and maintained, but not exciting at all.
40	2	USA, NY	Engineer	Home gardener	Peaceful and wild scene. Natural beauty, yet not overgrown.	Natural space, that reminds me of being in a field. Overgrown and un-maintained.	Peaceful setting, reminding me of a typical college campus.
68	1	USA New York	Educational Office Professional - Retired	Personal/Family gardens	Peaceful and pretty.	Very overgrown, like the patches of color.	Makes me feel like I am on a college campus. Would feel like having a seat and people watch.
74	1	Douglas County, Kansas	library children's programing, greenhouse grower, storyteller, preschool teacher.	I have grown flowers since I was a child. My husband and I have grown a vegetable garden for 55 years. We have a butterfly garden and grow many flowers.	It has color, there is a chance to see butterflies, birds, bees, something interesting so I am excited.	I like this wild look. Lots of color. Needs some milk weed varieties and more color, more variety of host and nectar type plants.	It is peaceful but lacks color.
62	1	USA - Virginia	Registered Nurse	Home gardens	I like the natural feel. It makes me think of Spring and the beauty of nature. I would feel carefree in this environment	I think it is a nice walking trail with wild flowers. It's a natural setting that makes me feel peaceful.	Thought out manicured landscape. Very orderly. No specific emotion.
33	1	Hong kong	MA, Commerce	Vegetables like tomatoes, eggplans, pumpkins.	.	.	.

24	1	USA, Colorado	Horticulture, Landscape Design	Have been gardening since I was young. Worked in the landscaping industry since freshman year in high school, which led me to getting a degree in Horticulture.	I love this picture! The green of the plant material contrasting with the limestone and the pop of color from the flowers. I love being in this space listening to the sound of the insects	This pictures makes me feel happy but also makes me cautious with the shadow of the tree in the background. I love the flowers spilling out on the pathway. I would love to read in this space.	it's beautiful with the canopies of the trees so full and green. It makes me calm looking at it but when I am in the space it is usually hurried, so causes stress.. ha
77	2	USA	Dr. Degree in Veterinary Medicine retired.	Farm related	Average beauty but pollen probably above average.	Path way that is some what overgrown but bees and butterflies would love it.	Beautiful part of campus and the right season to enjoy the surroundings.
58	1	USA	BS Animal Science computer professional	Plant things hard to kill	I could sit on the hill and relax due to the wild flowers	Calming due to the yellow along the path; better without the road at end of it	Reminds me of a college campus. Be a nice place to walk around with the trees for shade
21	1	Western Australia	Architecture	Gardening as a side hobby, snack small aquaponic projects	I like the variety of coloured flowers in this image. The green stands out and the vegetation looks alive, vibrant and thriving. It would be a nice spot to sit if a bench was placed somewhere in the middle of the flowers.	I like how there's a spot to sit and how the orange flowers stand out. The pathway breaks up the amount of vegetation nicely so the vegetation isn't overwhelming.	I like the amount of vegetation compared to built structures. Makes me want to walk through the space it's quite meditative and peaceful and serene.
23	1	Kansas	Wildlife Ecology	None!	I like the diversity in the flowers and the colors are nice. I would feel relaxed there	Looks overgrown, which makes me dislike it, but there's cover for animals/insects and more plant diversity. I would feel secluded there, but probably wouldn't hang out there because there'd be too many bugs	Hate the the quad. I feel like someone is always watching me.