ENTANGLED LANDSCAPES:
DESIGNING WITH A MULTI-SPECIES PERSPECTIVE IN THE POST-INDUSTRIAL SYRACUSE INNER HARBOR

Honors Thesis
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OUTLINE

ABSTRACT

Pollinator species are extremely important for food security and drive the agricultural economy, but are in decline primarily due to habitat fragmentation and the effects of climate change. Rust Belt cities like Syracuse have suffered from social and economic decline, and the primarily post-industrial landscapes lack pollinator habitat. By understanding the entanglements of economy, technology and species interactions, it's possible to see cities like Syracuse playing a key role in developing a productive green economy. How can analyzing landscapes from pollinators' perspective give insight into how to rethink the way landscape architects design for the benefit of multiple species? And how can this lead to the creation of landscapes that benefit both people, other species and the environment? Designers must move away from the typical anthropocentric design methods and explore new techniques for altering the landscape. This thesis is experimenting new methods of site analysis and design with the goal of embracing the entanglements and allowing for multi-species engagements to create a sustainable and productive landscape.

For years, humans have learned to control nature to suit the needs and desires of civilization. Cities have increasingly grown and sprawled, leaving many urban centers with post-industrial conditions and vulnerable populations. There is no longer a clear divide of humans from nature, man-made landscapes from natural landscapes, urban from rural. In a globalized society, technology, communication, environmental qualities, and species interactions are all interconnected. Humans have entanglements that tie us to the rest of the globe.

In "The Enlightenment is Dead, Long Live the Entanglement," Danny Hillis writes that "we have become so intertwined with what we have created that we are no longer separate from it" (Hillis, 2016). Our relationships with technology and nature are constantly changing and we must adjust to these in our design processes. Beauty is no longer in the static product, but also in the process (Hillis, 2016). Through the lens of landscapes, a completed site design is now less important than the processes and dynamics of a landscape as it finds its place in the entanglements of the world. We are in a critical place where we have the chance to remake ourselves and our relationships to the world. In these post-industrial cities, loss of industry and population in the urban core due to subrubanization has lead to increased vacancy. Those left in the city are often of lower income, and less mobile, resulting in less pressure to redevelop due to the stagnant population numbers. The urban core has an excess of landscapes embedded in it that can be taken advantage of to help rethink the way we interact with nature in cities. There is the opportunity to remake cities and the landscapes that compose them.

Jane Amidon also claims that we need to redefine our relationship to nature in the essay "Big Nature" (2010). Amidon takes an approach to this subject with a little more of a focus on landscape architecture. In this new time period, "public space has been enlarged to include amenities for people and the environment" (Amidon, 2010). The design of public space can no longer just fulfill the needs of people, but the environment and the species included (Amidon, 2010). In addition to modern technologies remaking our landscapes, Amidon points out that we can use our entanglement with technology as a catalyst for more productive change (2010). For example, these technologies can help us to "virally increase awareness" of a variety of issues that face people and society (Amidon, 2010). In agreement with Hillis' claim that the beauty is now in the process, Amidon asserts that there is no longer a site plan in design, but a "geotemporal matrix" that includes multiple levels of management and change over time (2010). This new approach to design will be crucial in achieving the needs in the increasingly entangled network of humans, technology, species, etc. She also notes that we must look beyond the site scale and strive for "continuous productive regional landscapes" (Amidon, 2010).

In the essay "Ruin" from the book entitled "The Mushroom at the End of the World" Anna Tsing discusses the ruination of forests in Japan and Oregon and across the world, and notices the interconnectedness of it all (2015). "...even the most geographically, biologically, and culturally disparate forests are still linked in a chain of destruction" (Tsing, 2015). The intricacies of the encounters in the entangled world are all important – some more than others – but they all begin to tell a small part of the story of complex interactions that take place every day.

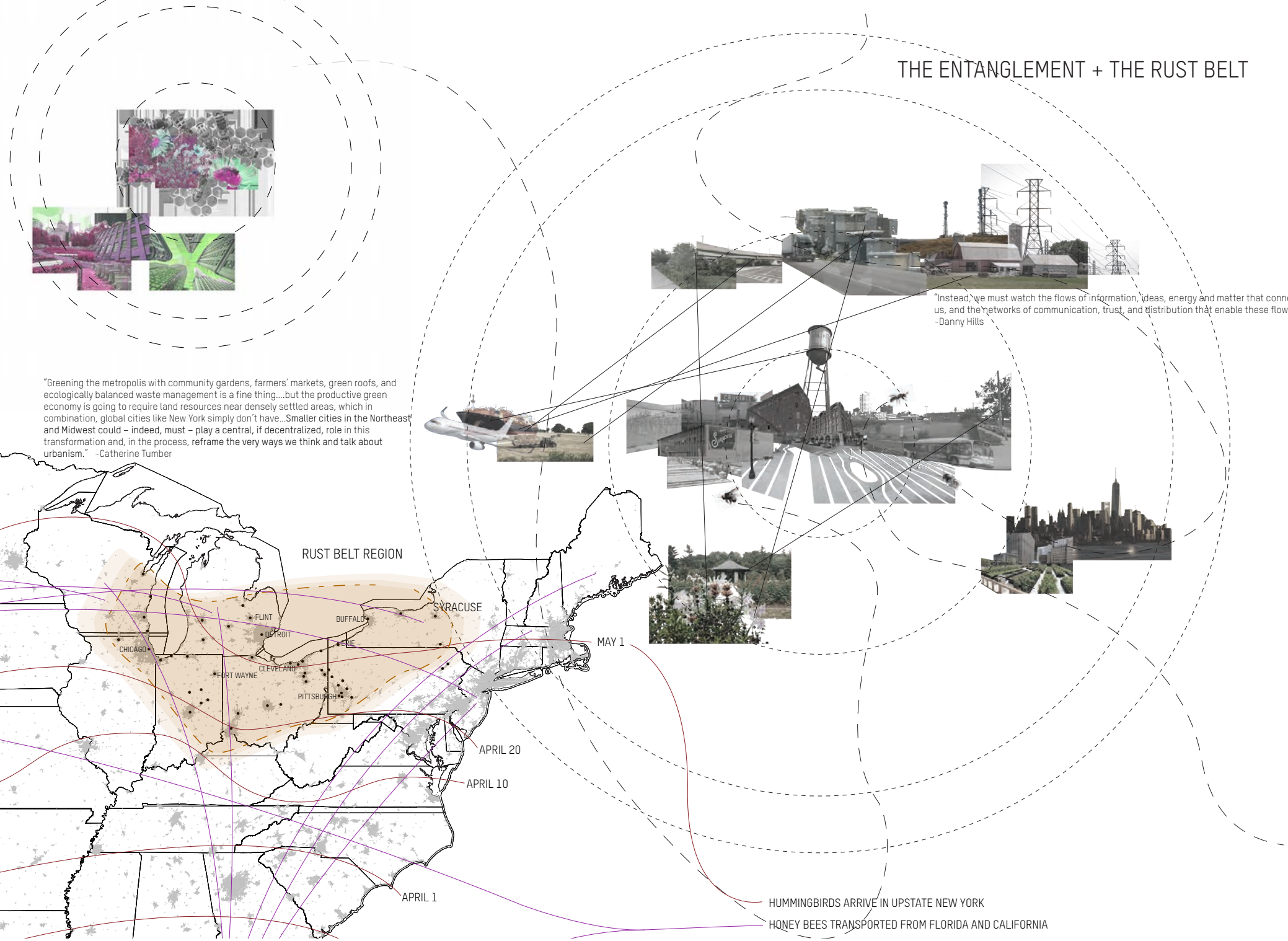
POLLINATOR AND HUMAN ENTANGLEMENTS

This thesis explores the entanglement of the human-pollinator relationship. Pollinators are critical to human survival. Several species, honey bees being the most important, are crucial to the agricultural economy and guarantee our food security (Abrol, 2012). However, our human alterations of the landscape are having negative effects on pollinator populations. Human health is inextricably linked to the health of pollinators. On the other hand, there are some negative aspects of the human-pollinator relationship. Bees and other insects can sting humans and cause severe allergic reactions. Higher amounts of bees in urban areas might not be not received well by some people.

THE RUST BELT CITY AS A REFUGE FOR POLLINATORS

With bee and other pollinator species in decline, it will be important to create more habitat for them to thrive. Current urban areas are threatening for pollinators with mostly hard, non-green surfaces and buildings, offering little opportunity for habitat (Marinelli, 2017). In addition, rural areas are also becoming a threat with the increased use of pesticides. In this case, it is possible that urban areas can become a refuge for bees. If adequate habitat and resources are provided, bees and other pollinators could thrive and urban areas could act as places that connect corridors of pollinator resources (Marinelli, 2017). Rust Belt cities specifically can be a good place to test these ideas. The Rust Belt cities have suffered severe economic decline after most of the manufacturing that took place moved out of the country. Populations in the cities declined and the remains of the old industrial landscapes are still very present in the urban fabric of these cities. Catherine Tumber writes extensively about the potential of the Rust Belt cities in her book Small, Gritty and Green (2012). She states that "the productive green economy is going to require land resources near densely settled areas...smaller cities in the Northeast and Midwest could – indeed, must – play a central, if decentralized, role in this transformation and, in the process, reframe the very ways we think and talk about urbanism" (Tumber, 2012). Rust Belt cities can provide an opportunity to reimagine the relationship that people have with the landscape and other species, and how to design for this shift.

THE ENTANGLEMENT + THE RUST BELT

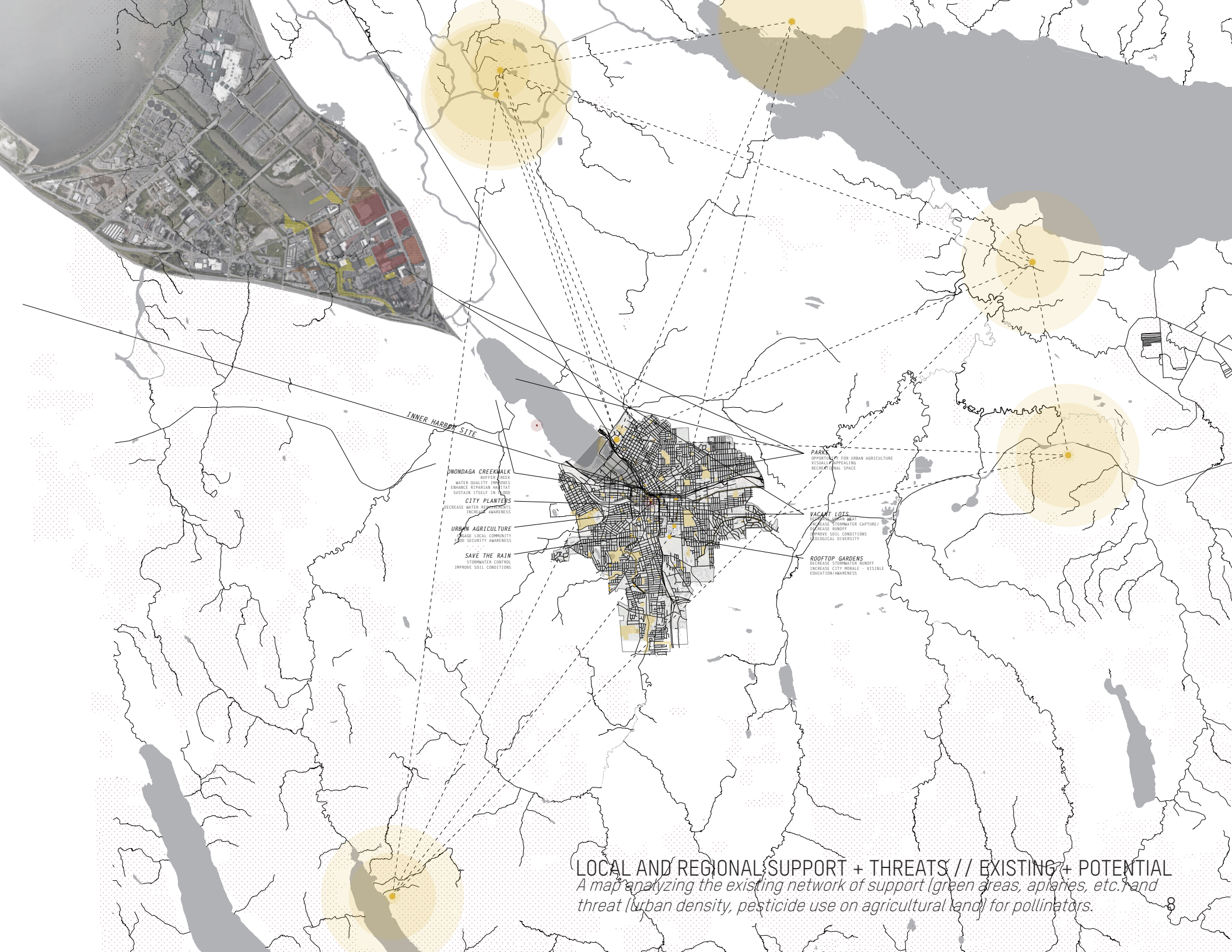


A graphic representation of the entanglement, at the regional and global scale, with a map indicating the Rust Belt region and larger scale movement of pollinator species.

At the conclusion of Hillary Brown's "Infrastructural Ecologies" she writes that we must "test innovative infrastructures" before implementing a large-scale framework of new infrastructure (2010). There are big questions at stake and no easy way to go about tackling them. How do we approach landscape design with these new relationships and entanglements between species and technology? How does the role of public space change? How do we create spaces with sustained public support, that are desirable to people, but ecologically functional? And will all of this cayalyze the change needed in the world? Instead of trying to answer them all at once, Brown's method of first testing these infrastructures, is a valuable approach. To begin investigating new types of infrastructures, I propose to start at a local scale, looking through a specific lens – pollinators. Pollinators include several species and are a great representation for the entanglemet that humans have with other species. The network of pollinators and their role in the environment is complex and crucially linked to human and other species' survival. Beyond just bees, a range of pollinators will be investigated, recognizing that there is a more complex network of pollinator interactions than most think. Bees, insects and other pollinating species help guarantee a global food supply. The large quantity of both small and large collective actions that have led to global climate change is having profound effects on pollinator populations. Modern technology and human actions have led to extreme climate events, pesticide applications in rural settings, lack of green space in growing urban areas, all of which negatively affect the natural processes and routines that pollinators take for granted. The once harmonious relationship that pollinators had with plants and people is now messy and entangled.

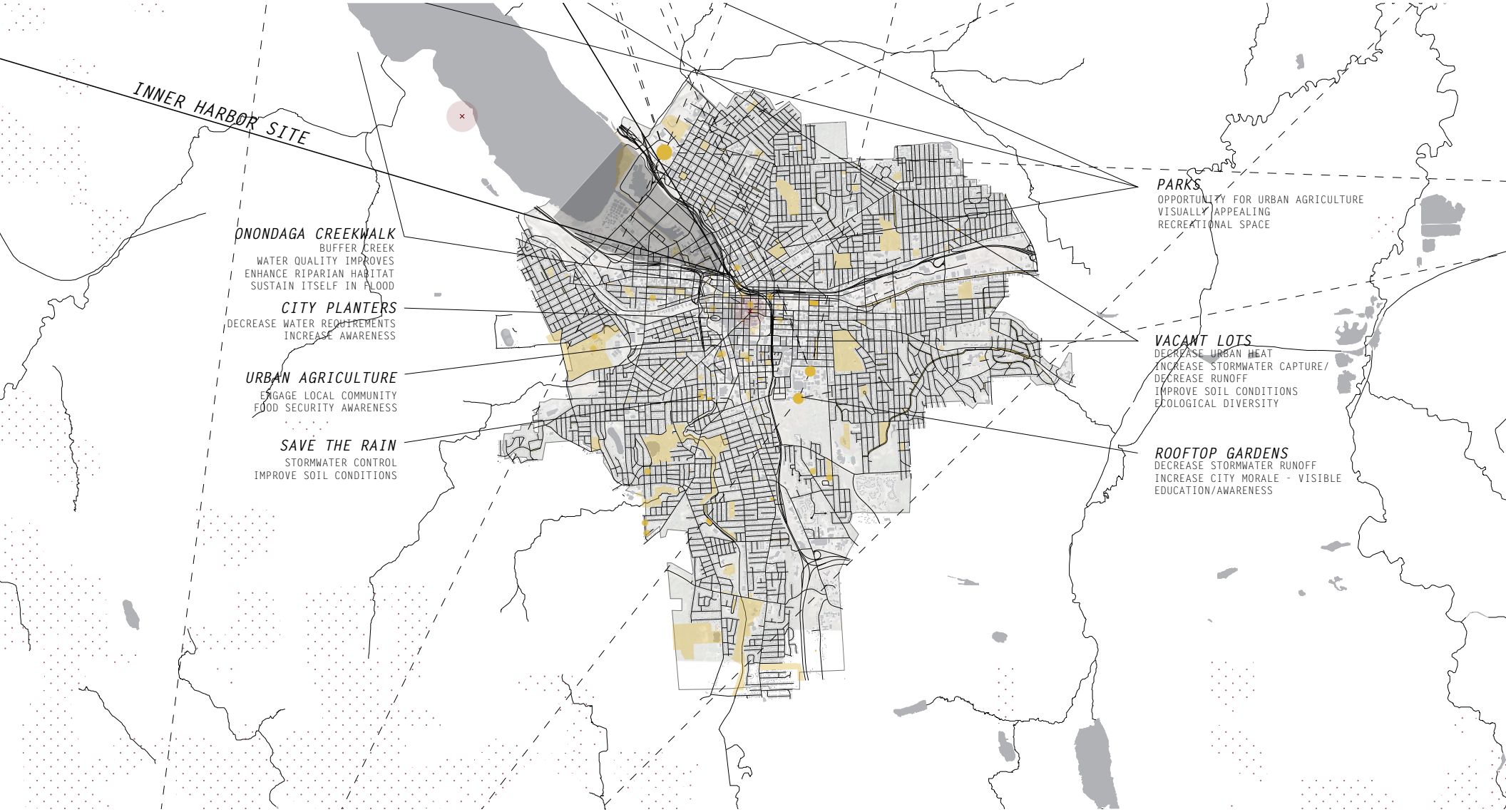
To investigate how the study of pollinators in regard to this topic will begin to tackle some of these questions, this thesis uses the city of Syracuse as a case study. Industries and people used to populate the downtown area, but now the suburbs hold most of the population and the central city contains many abandoned factory buildings and industrial sites accompanied by vulnerable populations. The conditions left from these changes are not necessarily suitable to pollinators. However, what used to thrive here has left a gap, and it is presenting the opportunity for something new to thrive in its absence – a new kind of landscape that is both seductive and productive, as Amidon says (2010).

This new approach to landscape design is not soley focused on pollinators. We are no longer taking a strictly anthropocentric view, however it is still the humans who need to be convinced by this new approach. The direct human relationship with the pollinator is also messy. Bees are not always seen as pleasant insects to have around, and some people are extremely allergic to and/or afriad of them. Their potential to sting will be a challenge in the acceptance of landscapes in support of pollinators. As Amidon has stated, the "modern public rarely warms to productive land uses" (2010). It will be difficult to convince people on the importance of the pollinator-human relationship in the entangled messy world . However, these challenges are minute compared to the larger challenges that societies are facing in the landscape.



LOCAL AND REGIONAL SUPPORT + THREATS // EXISTING + POTENTIAL

A map analyzing the existing network of support (green areas, apiaries, etc.) and threat (urban density, pesticide use on agricultural land) for pollinators.



LOCAL SITE TYPOLOGIES

A variety of site typologies are identified with existing and potential benefits listed. However, these are very human-focused and this thesis aims to learn the benefits to pollinators as well, to gain a new understanding of the landscape.

SITE ENLARGEMENT

The Inner Harbor site was identified as the focus area because it contains a range of site typologies from vacant to more developed areas.

DESIGN EXPERIMENT

To test the ideas of designing for other species, this thesis uses Syracuse, New York as a test site, looking through the lens of pollinators, to make larger conclusions on how to design with a multispecies perspective in Rust Belt cities, and potentially larger cities as well. The proximity of the rural agricultural areas to downtown Syracuse presents the opportunity to strengthen the connection between urban and rural and create a larger regional network of new landscapes. However, the rural landscapes are part of the messy relationships that pollinators have with the global landscape. Pesticides sprayed have drastically affected their numbers (Abrol, 2012). The urban environment also poses many threats to pollinators (Marinelli, 2017). But, there has been recent research that has determined that the city can be a refuge for certain pollinator species, in some cases the rare or endangered species not always found outside of the city (Hall, 2017). In Syracuse, the Inner Harbor area will be used to research methods on for designing with a multi-species perspective. To what extent does designing vibrant spaces for pollinators do the same for people and vice versa? While there is pollinator habitat present in the city, how can we optimize and enhance those habitats, to create spaces that engage people and address the changing relationship humans have with landscape and the environment?

The research questions to be addressed are as follows:

- How can understanding pollinators (biology, environmental needs, threats, etc.) and analyzing the sites from their perspectives give us new insight into how to design for pollinators and other species?

- And how can designing for pollinators in this way be one step towards creating a productive green economy, that benefits both people and the environment, in Syracuse and other similar cities?

- What are the further implications on landscape architecture design methods, urbanism and methods for designing for other species' habitats?

These questions will start to suggest how to begin redefining our relationship with nature.

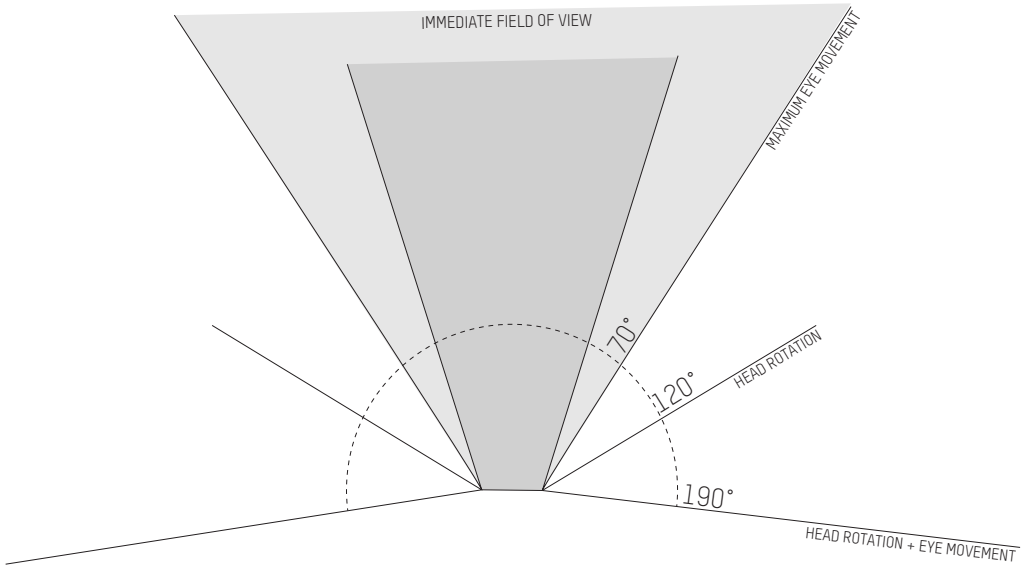
METHODS

By first understanding the regional and local networks of pollinator threats and support, such as apiaries, the threat of pesticides in rural areas, diseases recorded, etc., an understanding of the landscape from a human perspective will be shown, using conventional methods of mapping and diagraming. Through this initial mapping, the Inner Harbor was identified as a site because it contains a variety of typologies that range from vacant to more developed. It also is closely tied to the industrial past of Syracuse. Further research on pollinators was done to gain a knowledge of their preferred habitats, to discover potential benefits and optimizations for the different site typologies, apart from our typical highly anthropocentric incentives. Three different pollinator species were chosen to study as case studies – bees (both solitary and eusocial), hummingbirds and beetles. The methods of their navigation, details of their eyesight, points of interest and threat in the landscape were determined. Using this knowledge, a method for analyzing the site through the eyes of the pollinators was developed, as a portal into their world. A very experimental method of drawing is being used for simulating the vision of each pollinator. In no way is it completely accurate, but it is an interpretation based on research, which also contains a layer of analytical information. From here, these analyses will be used to inform design moves, for considering a multi-species perspective in the age of the Entanglement.

HUMAN

Human vision of the landscape is familiar to everyone. However, every human is different and the complete picture of the landscape develops over time. The human view of the landscape is often gathered over several, distracted encounters with the site. As James Corner writes, "the experience of the landscape *takes time,* and results from an accumulation of often distracted events and everyday encounters" (1992). Humans are "often in a distracted state, the individual paying little, if any attention to their immediate environment" (1992). Our field of view is often limited by our head rotation and eye movement. The following graphic is representing this patchy view of the landscape that accumulates over time.

"Landscape experience, meanwhile, is received in moments, glances, and accidental detours, kinesthetically unfolding through rambling and habitual encounters over time." —James Corner



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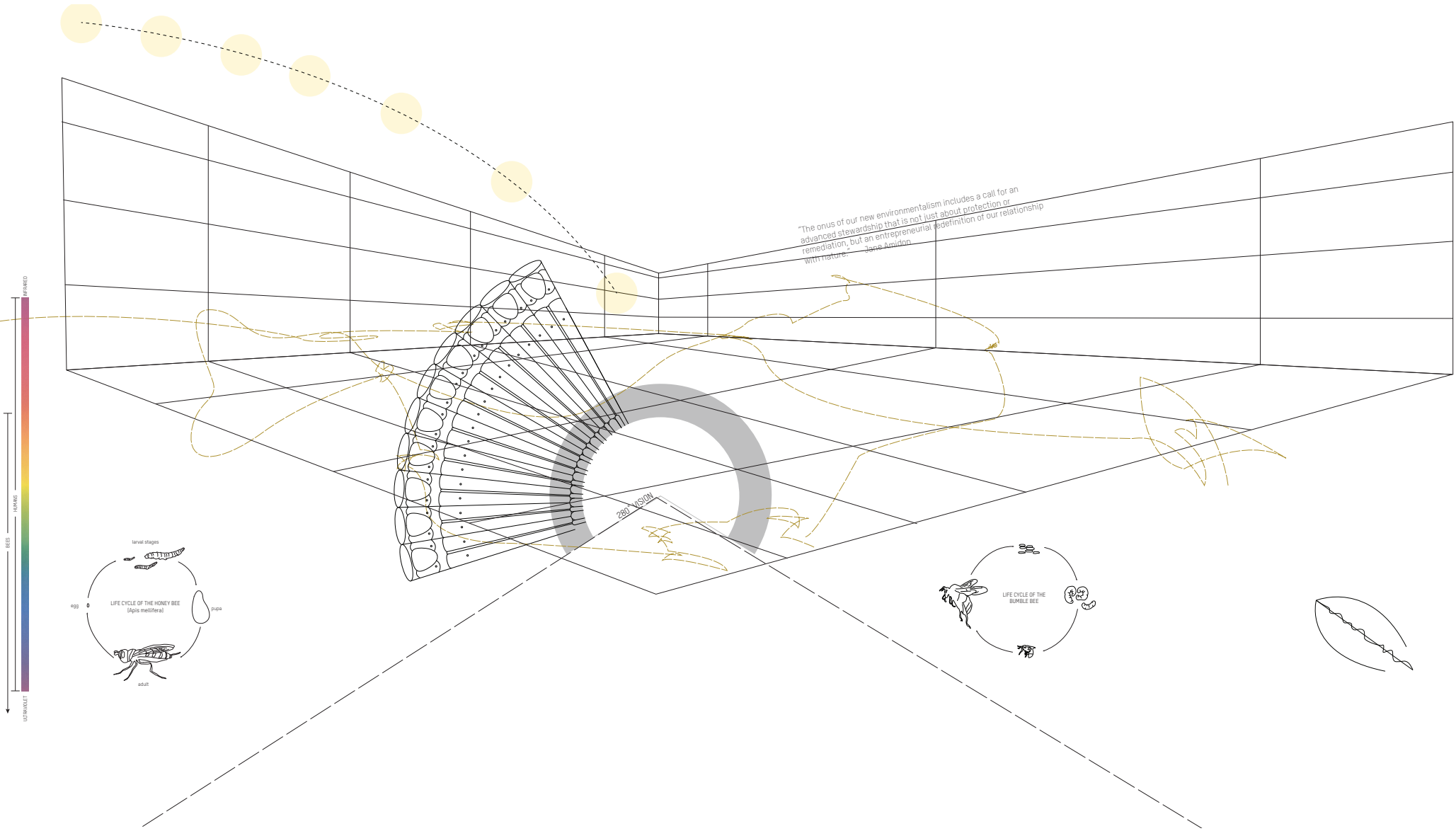
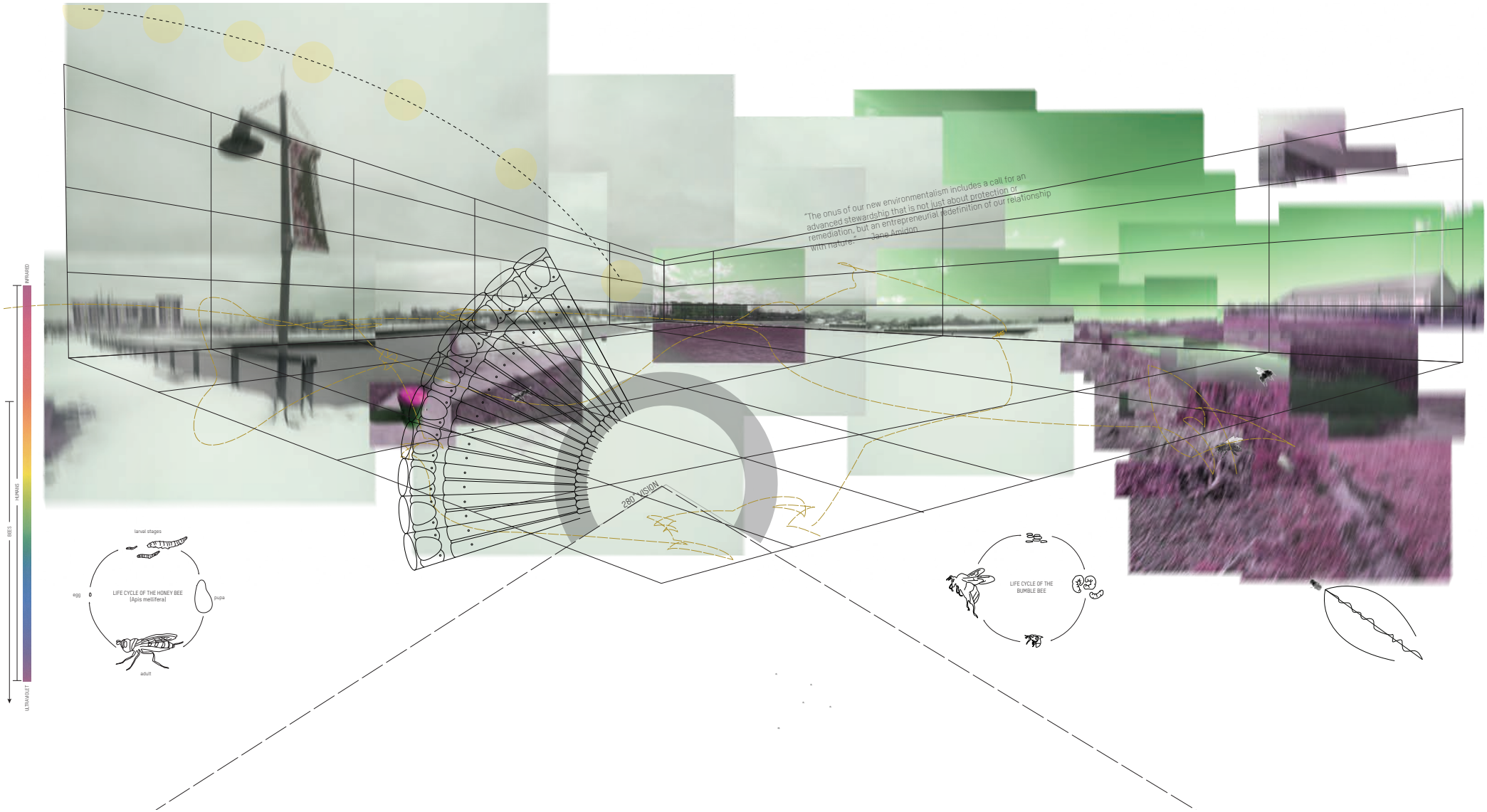
BEE

Bees see a different color spectrum than humans, having the ability to view ultraviolet light (Riddle, 2016). Their wide field of vision gives them a much greater range of site than humans, and makes it easy to spot pollen. Their navigation is based off the position of the sun, and a special 'dance' communicates to other bees the location of the good sources of food (Riddle, 2016). Bees have a good sense of depth, distance, and their vision performs better when in motion (Riddle, 2016).


"The onus of our new environmentalism includes a call for an advanced stewardship that is not just about protection or remediation, but an entrepreneurial redefinition of our relationship with nature." Jane Amidon
280° VISION
INFRARED
HUMANS
BEES
ULTRAVIOLET
larval stages
egg
LIFE CYCLE OF THE HONEY BEE
(Apis mellifera)
pupa
adult
LIFE CYCLE OF THE
BUMBLE BEE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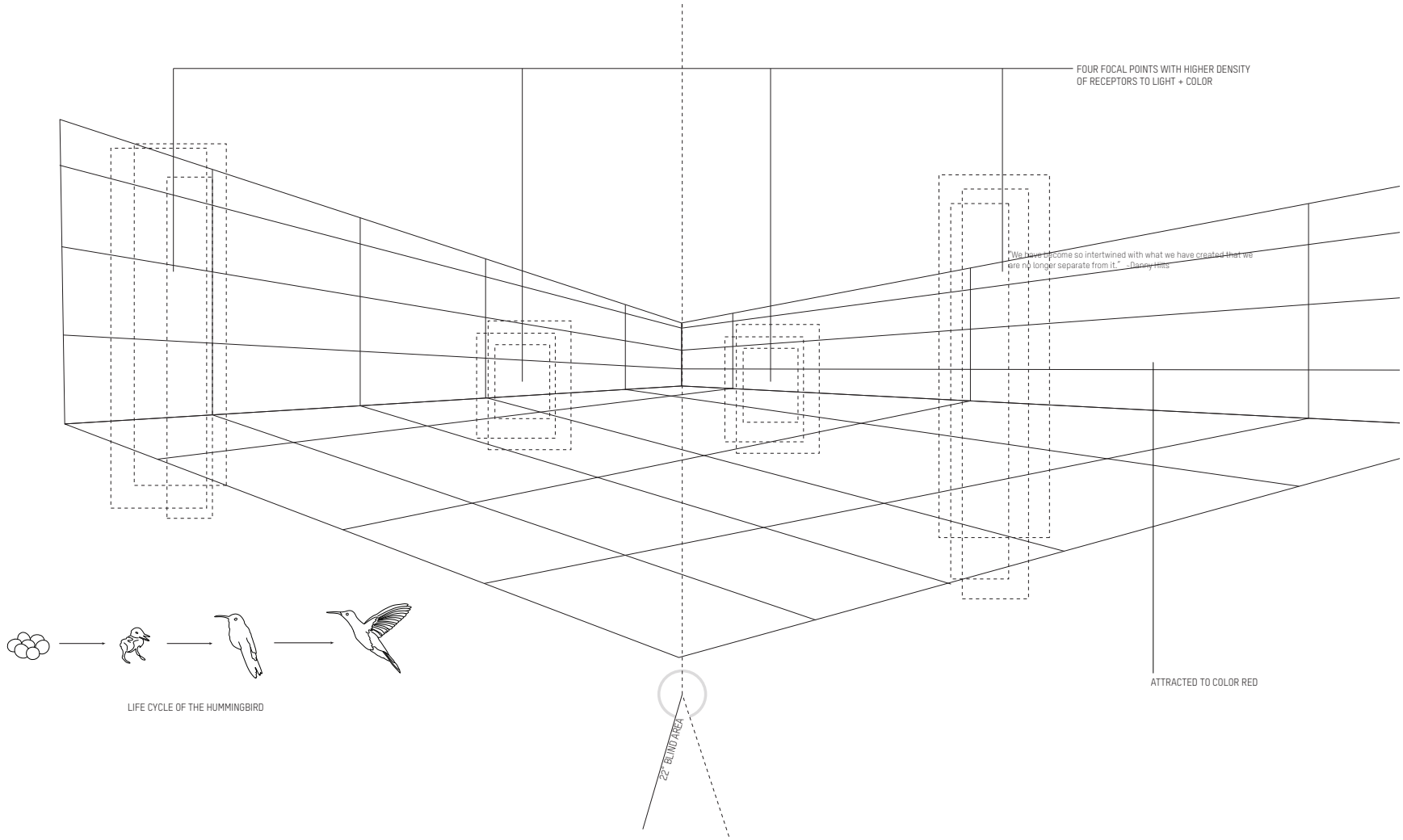
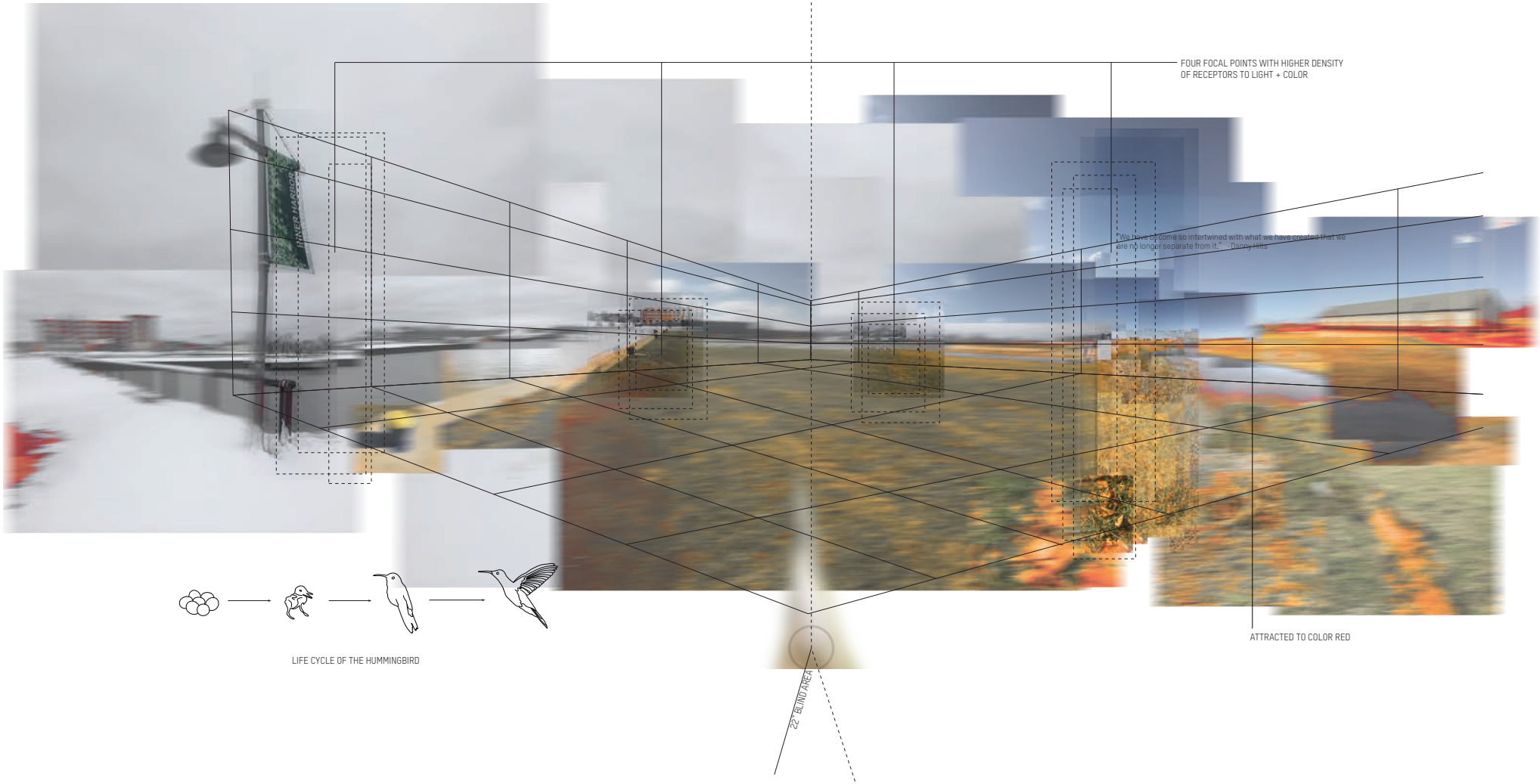
HUMMINGBIRD

Hummingbirds also have a wide field of vision, and see into the ultraviolet spectrum (Panko, 2017). This makes anything red in the landscape appear very attractive. Four spots in their field of vision have more receptors to light, allowing more precise vision at those points (Panko, 2017). They fly at very fast speeds through the landscape. By studying their field of view, it has been determined that hummingbirds only have a small 22 degree blind area behind their heads (Tyrrell ,Goller, Moore, & Altshuler, 2018). The graphic is representing the wide field of view of the landscape rushing past, with the four focal points of higher clarity.


FOUR FOCAL POINTS WITH HIGHER DENSITY
OF RECEPTORS TO LIGHT + COLOR
"We have become so intertwined with what we have created that we are no longer separate from it." - Danny Hills
ATTRACTED TO COLOR RED
22° BLIND AREA
LIFE CYCLE OF THE HUMMINGBIRD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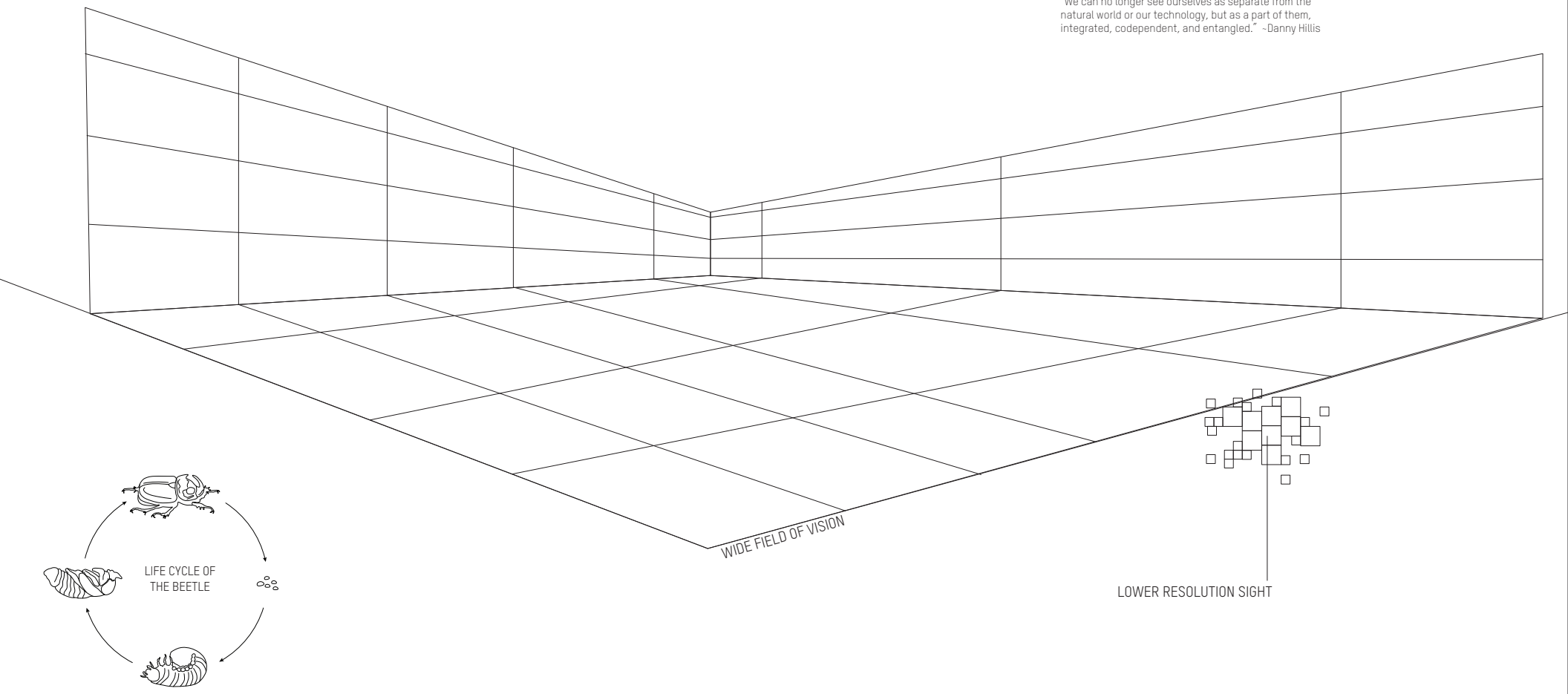
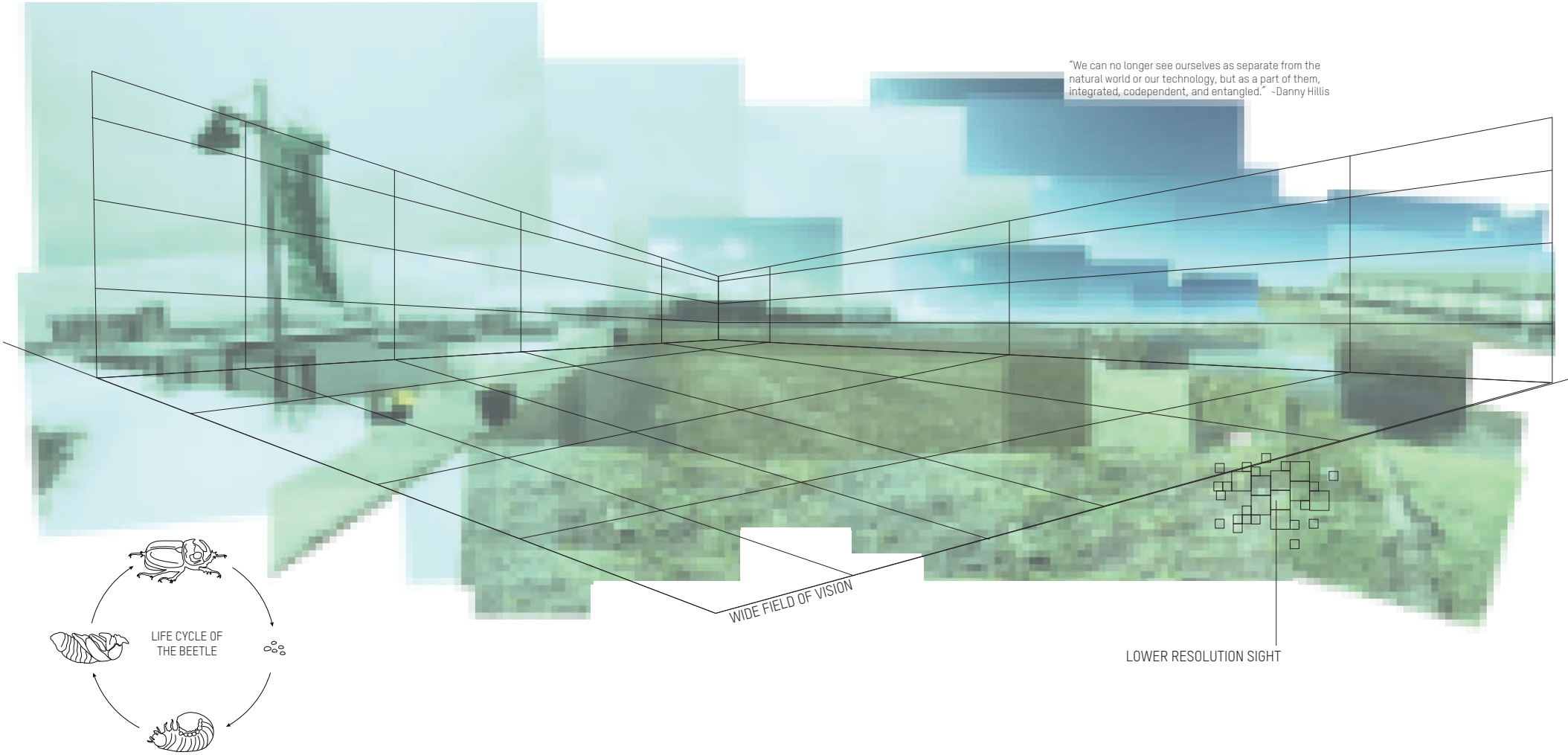
INNER HARBOR
LIFE CYCLE OF THE HUMMINGBIRD
ATTRACTED TO COLOR RED
22° BLIND AREA

BEETLE

Beetles also have a wide field of vision. The beetle only has two color receptors, and lacks the ability to see the landscape at a very high resolution (Byers, 1997). Beetle vision varies from species to species, so this graphic is a generalization, interpreting how the average beetle might view the Inner Harbor landscape.

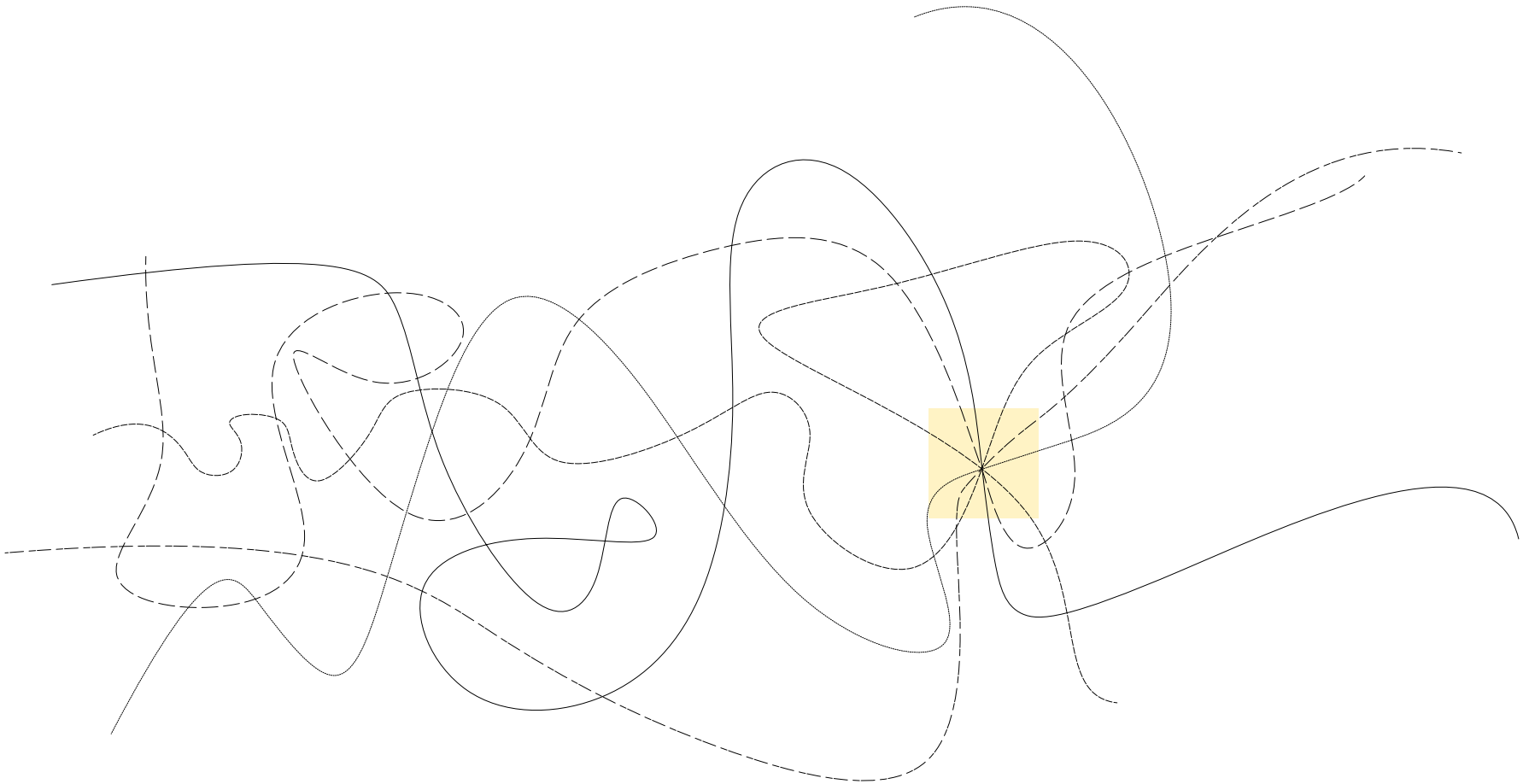
"We can no longer see ourselves as separate from the natural world or our technology, but as a part of them, integrated, codependent, and entangled." ~Danny Hillis

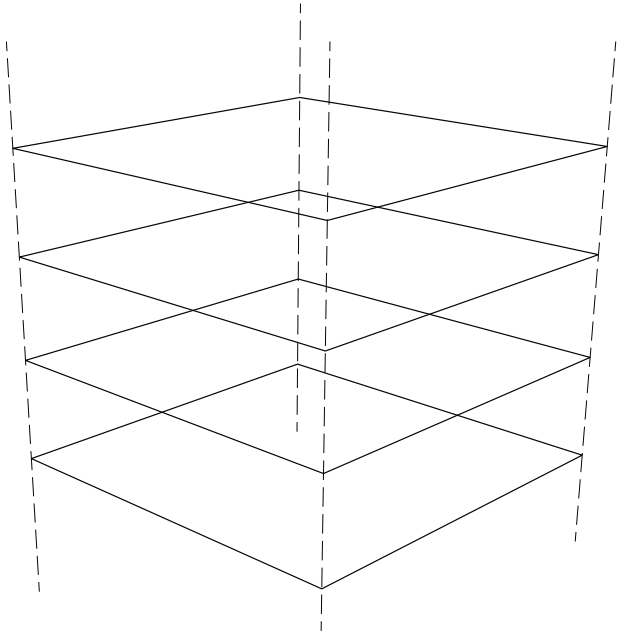



"We can no longer see ourselves as separate from the natural world or our technology, but as a part of them, integrated, codependent, and entangled." ~Danny Hillis
WIDE FIELD OF VISION
LOWER RESOLUTION SIGHT
LIFE CYCLE OF THE BEETLE

CONFLUX OF ENTANGLEMENTS + ENGAGEMENTS

All the species using the landscape are engaging in different ways - sometimes their paths cross, but in this complex entanglment of interactions, there is not a specific spot where all species engage. This thesis is exploring how design could allow for engagement by all species, either at the site scale, or a very specific area within the site, and how the resulting landscape could manifest itself. An orchestrated moment in the landscape where all species can engage will draw awareness, be rich and vibrant for humans and other species, and potentially be a form that could be placed into the landscape as a “seed” for larger landscape infrastructural changes to benefit multiple species.





LANDSCAPE AND HABITAT REQUIREMENTS

HUMMINGBIRDS -- areas to perch, attract other insects for protein source, presence of water, nectar feeders, red tubular flowers, fuzzy plants for nest construction (Bell, 2001) (Cubie, 2002)

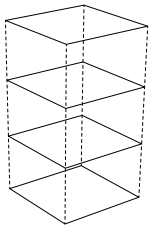
BEETLES -- leaf piles to attract slugs and other insects for food, compost heaps for overwintering, piles of stone for protection, dead wood stacks (Marks, 2005)

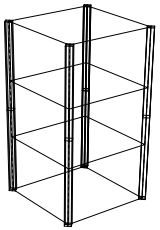
BEES -- bare soil in sunny locations for ground nesting, bee bank for ground nesting, continuous bloom of plants throughout season, clean water source, hollow wood for solitary bee nesting (Marks, 2005)

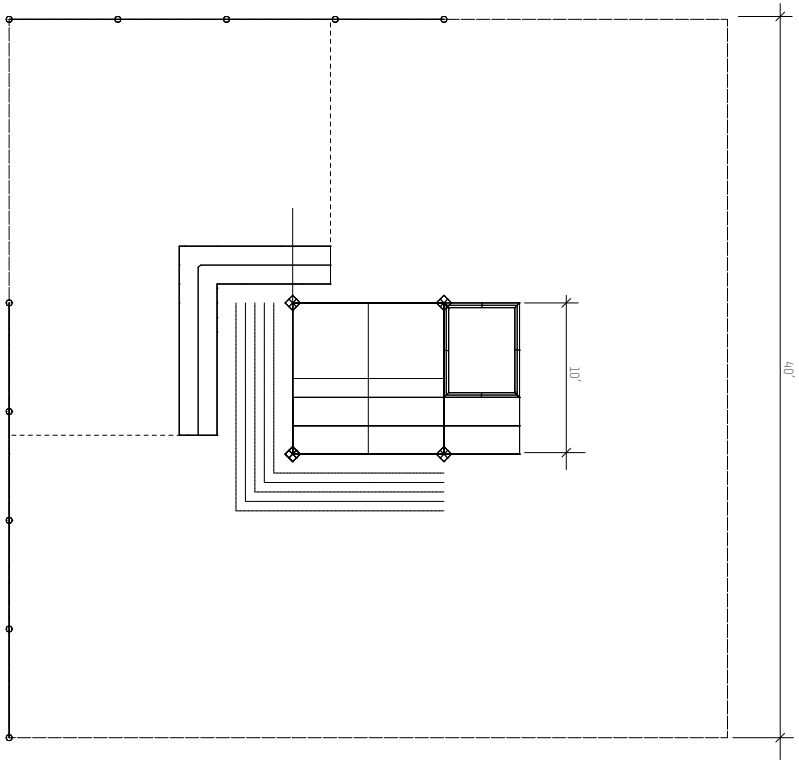
HUMANS -- visually pleasing area, colorful plants, areas to sit, sun and shade areas, opportunities for education

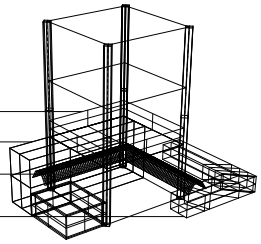
INITIAL DESIGN CONCEPT MODELING

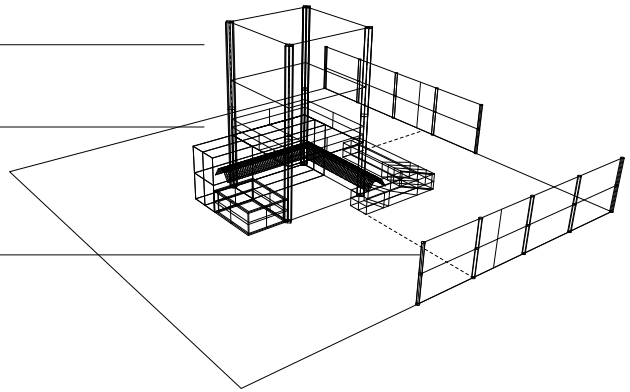
Using the design concept of multiple layers for the benefit of different species in one specific square of the landscape, this framework was developed using a Grasshopper definition, so that it could easily be manipulated to adapt to site specificities. A modular form is created that has benefits for all species that have been studied, allowing this to test the outcomes of having one spot of interaction and engagement by all.



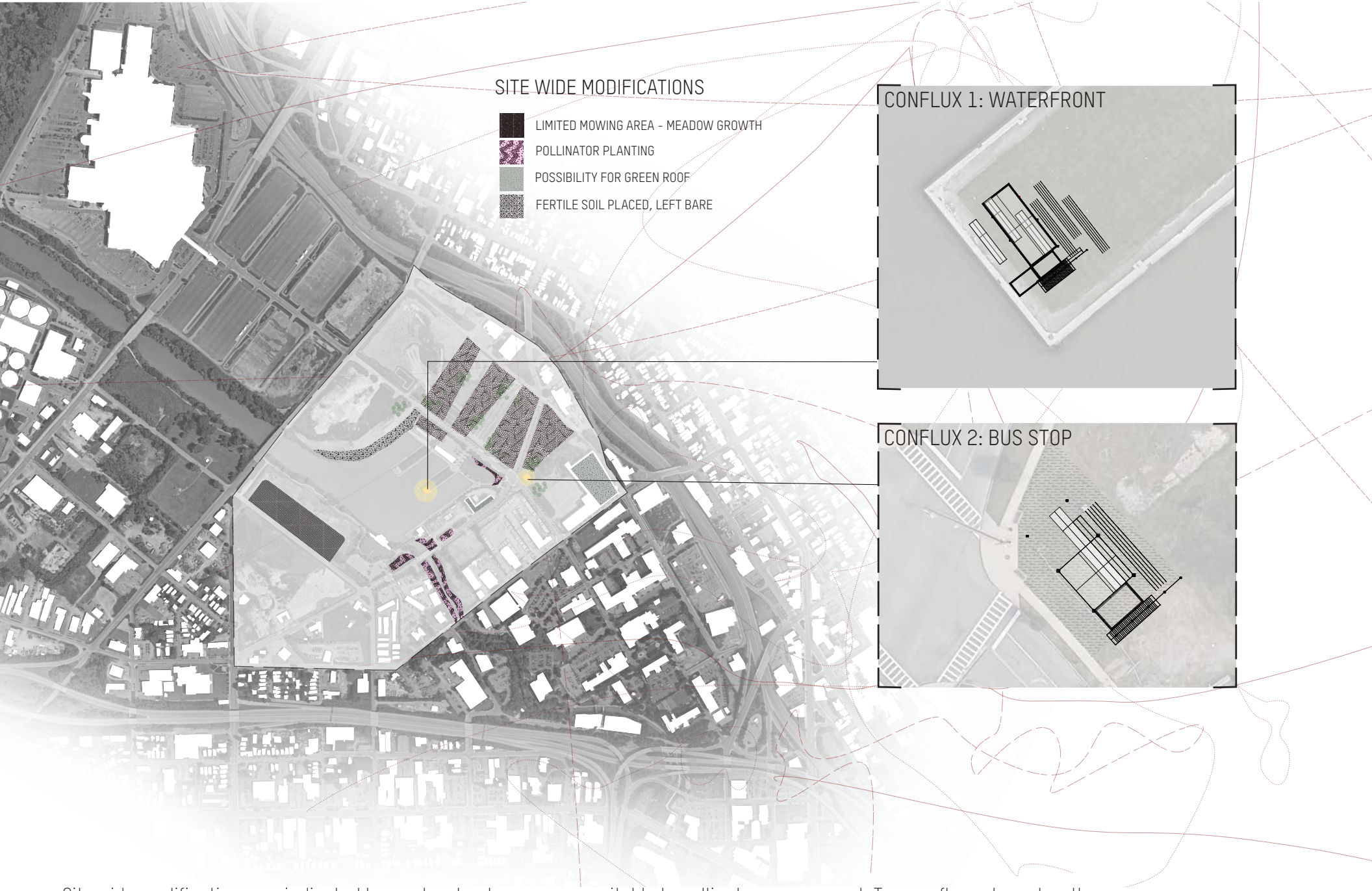








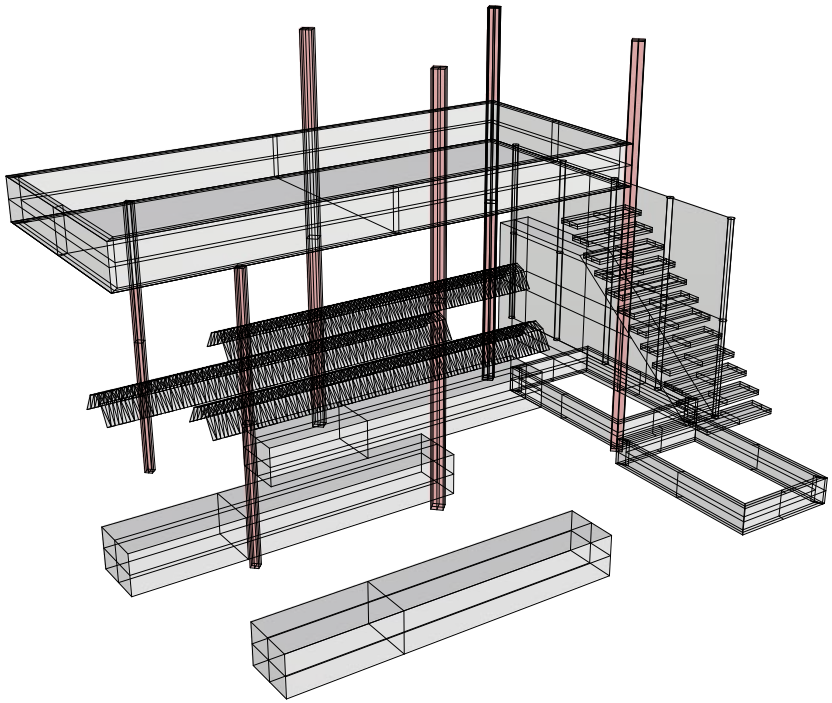
INNER HARBOR SITE DESIGN



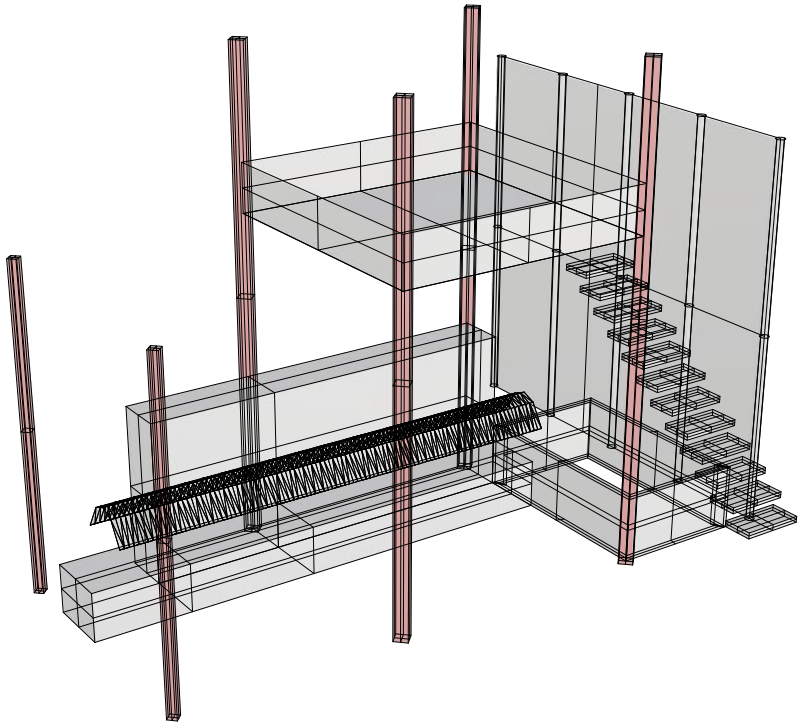
Site wide modifications are indicated to create a landscape more suitable to pollinator engagement. Two confluxes based on the modular framework are placed in two areas of the site where people gather and that lack pollinator habitat.

CONFLUX DESIGNS

The designs provide adequate cover and seating for human use, while providing additional benefits for the pollinator species, encouraging interaction by multiple species. The red framework attracts the pollinator species, but also captures the attention of humans. The form mimics the basic structure of old, abandoned industrial buildings, and the materials would be a mixture of organic and recycled materials that resemble the industrial past of the Inner Harbor.



[WATERFRONT]



[BUS STOP]

WATERFRONT CONFLUX - view from the perspective of a pollinator near ground-level.

BUS STOP CONFLUX - view from the perspective of a pollinator above.

CONCLUSIONS

In the process of trying to understand and represent the landscape from the perspective of other species, it became clear that humans engage in the landscape in a very different way. After this was made clear, the design framework developed became an attempt to design with a more multi-species perspective. These design interventions are very experimental in nature and would become a way of testing these moments of conflux in the entanglement. The modular aspect of the design allows them to be modified and altered based on the way they perform. It cannot be concluded that these areas of conflux will be completely beneficial. There may, in fact, be conflict between species. The design might have to be altered to keep species at a certain distance from one another – human presence being the most likely to keep pollinator species away. However, these design tests will allow for the evaluation of areas where all species can engage. What can we learn from these moments in the landscape? These small acupunctural moments will not solve the issues at hand. The site wide modifications will do a better job at bringing adequate habitat for pollinators into urban areas, creating a refuge in an unlikely place. It is my hope, though, that the conflux moments bring awareness to people, and advocate for a different view of the landscape, by landscape architects, but also regular users of the site. Even if not received well, it will lead to discussion and the beginnings of a new relationship with nature. They will hopefully act as a seed for larger landscape changes, both in terms of spreading habitat, but also push designers to rethink the traditional methods, and have less of a focus on humans and begin to take more of a multi-species approach.

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