

POLLINATOR PARADISE



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Thesis 2017-2018

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POLLINATOR PARADISE

Restoring Bee Habitat Through A Public
Recreational and Educational Park in
Los Angeles, California

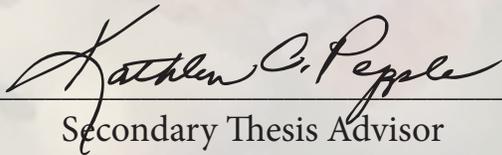
A Design Thesis Submitted to the Department
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By
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Bachelor of Landscape Architecture



Primary Thesis Advisor



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THESIS ARCHIVAL NOTE

The following thesis project, entitled *Pollinator Paradise, Restoring Bee Habitat Through A Recreational and Educational Park in Los Angeles, California*, was composed over the course of the 2017-2018 academic school year. The Thesis Program, as contained here, was initiated and completed in the fall semester as a part of the LA 563: Programming and Thesis Preparation course. Supplemental material, including the Thesis Boards and the Thesis Presentation documents, were generated in the spring semester as a part of the LA 572: Design Thesis studio. Any inconsistencies between the different documents, in terms of research and design, should be excused per the evolution of the project across the two semesters.





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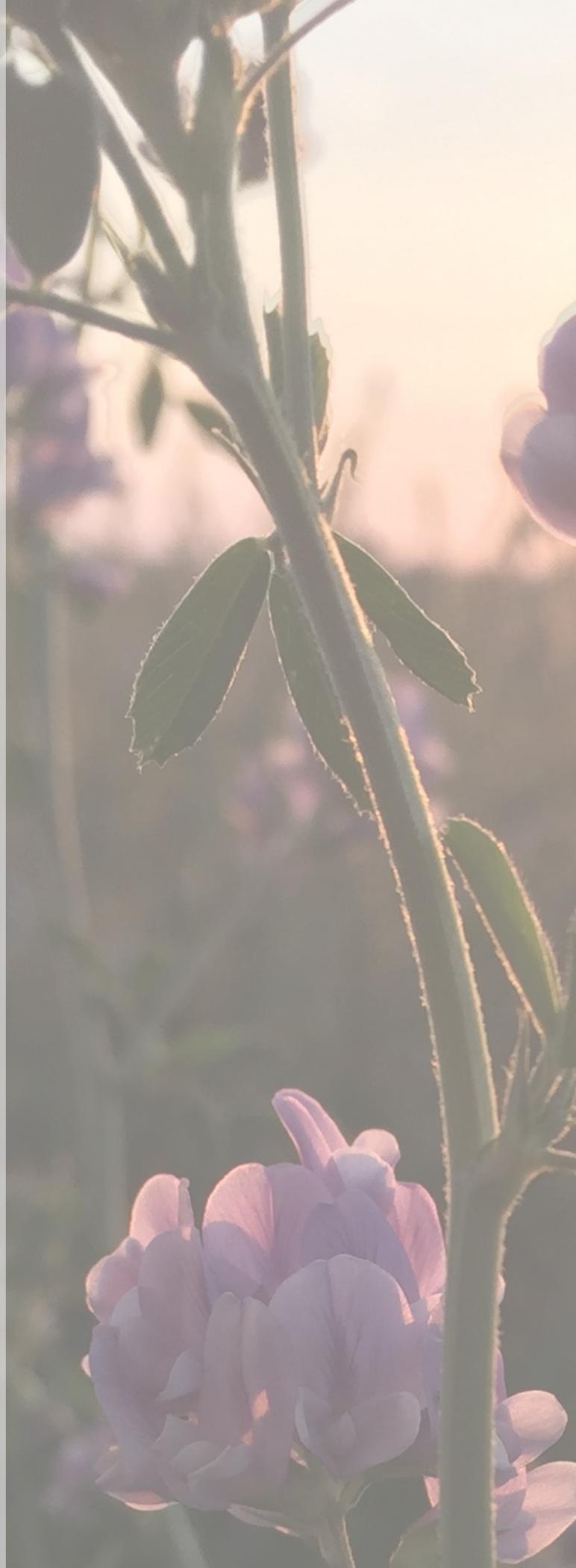
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Thesis Abstract

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Bees play an important part in our community, they pollinate over one third of all of our food. Many people do not realize the importance of bees and pollinators and their existence. How can we educate and protect such an important part of our every day lives? The redesign of the Los Angeles River front project promotes bringing the bees, pollinators and the public together to create a Pollinator Paradise. This type of project could benefit the society over all. The redesigned river front will educate the public on the importance of bees while attracting and becoming the home to the pollinators. Studying ways of educating the public on the bees and pollinators that will live on the site, will help me replicate the ideas to my project. I am going to study the different types of bee species and the pollinator plants in the Los Angeles area. I am also going to study in depth the way bee hives operate and the different types of bees that are in a hive. Another aspect of the study of the bees is how the micro-climate of the site can attract the bees and create a successful pollinator paradise.

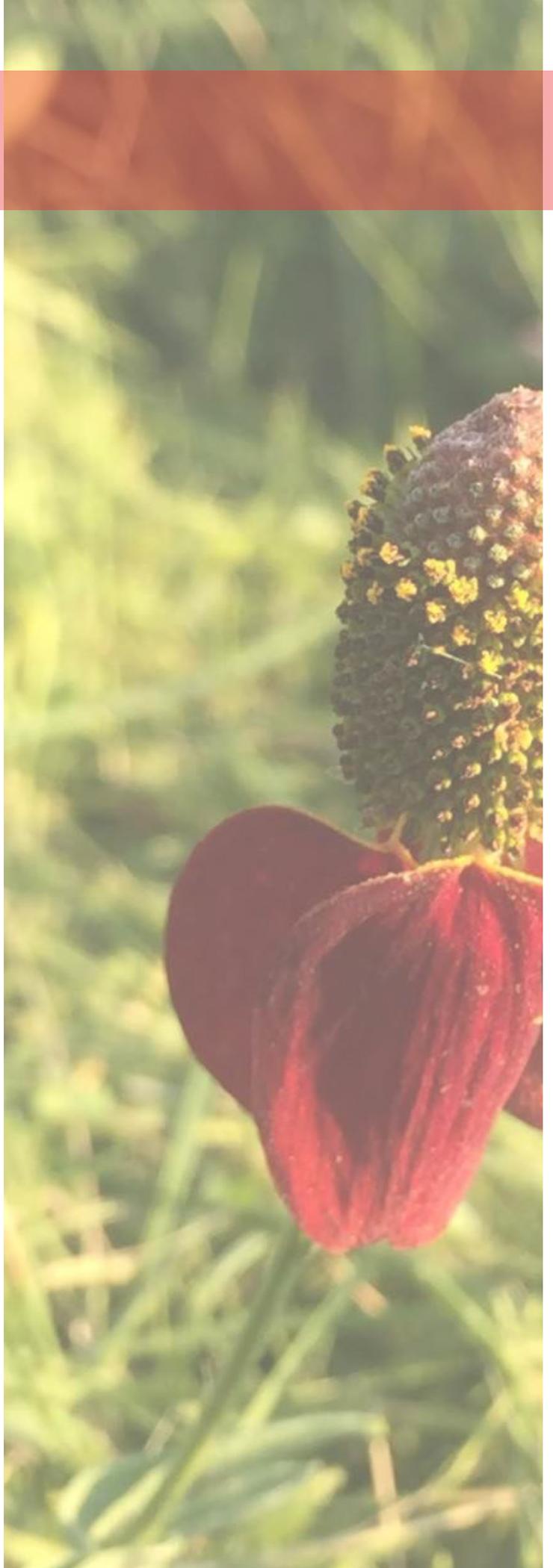




The Narrative of the Theoretical Aspect of the Thesis 2

Growing up in the garden I was always interested in the bees and butterflies flying around my grandmother's perennials. I shortly learned how important they were to the garden, and their purpose in creating this colorful garden escape. As the years went by my interest only grew. Even now, as I am in college, I am still as fascinated in pollinators and concerned about their importance to our community. I have always tried to make a point in bringing pollinators to my site, whether it was adding a perennial garden or planting specific plants to enhance the pollinator population. This interest has led me to my thesis project. My thesis project will contribute to the Los Angeles pollinator population through the planning and designing of a river front for a bee and pollinator paradise. The integration of educating the public on the importance of bees and showing them not to fear the bees and pollinators.

The Los Angeles River is currently a concrete ditch. There is potential for creating a paradise for the bees through the redesign process. By re-purposing this river front, it encourages the public to interact with the preexisting water, while also interacting with the bees and pollinators.



Project Typology

1. Linear Park/Riverfront Park
2. Conservation Development
3. Natural Resource Management

The type of project that would make an impact on the pollinator population would be a linear park project along the Los Angeles River front designed as if the bees were the number one priority. This project would include a green highway that would consist of plants specific for pollinators and a non-herbicide/ non-pesticide zone along with other important project elements.

One of the reasons for the bee and pollinator decline is a lack of habitat and the pesticides that are used to eliminate invasive plant species. The river in which this linear park would be located along, would create a water source for the pollinators in the Los Angeles area. The linear park along the river front would create a destination for the public to come and learn about the importance of pollinators while creating a natural home for the bees. The design is to be pollinator friendly, with an educational aspect. The plant choices in the community and park are the key feature in attracting the pollinators. Researching the native species and bloom time of perennials and plant types will give me a complete plant list for my successful pollinator river front paradise.





TYPOLOGICAL RESEARCH

William G. Milliken State Park, Phase 2 Lowland Park

Project Type: A reclaimed water front open space park that improves water quality and creates native habitats for birds.

Location: Detroit, MI

Size: 6.1 acres

The project covers over four acres of land that was contaminated from the preexisting features on the industrial site. The redesigned park now is home to a designed storm-water treatment system that includes many native species that clean and pull the contaminants from the soil. The site has signage throughout that explains the history and environmental impacts of the site. Creating this educational feature has helped others understand what is occurring on site. The park has places throughout that allow the public to enjoy their lunch and learn about the improvements to the scape. The recreational aspects include a long shore for fishing. The park also has a memorial for a conservationist that was involved in preserving the site.

The park connects the public with the water front, a safe, educational park that includes recreational aspects such as fishing. The park is now a native habitat for migratory birds and permanent species that reside in the Detroit, MI area. The mixed-use area allows for the interaction of the public with the now established wetlands.

Environmental Impacts:

The program elements of the storm-water runoff clean over 4.5 million gallons of surface runoff. Many of the existing contaminants are removed because of the system. The water front park is now a native habitat for many species of birds that have suffered from their habitat, wetland area, being destroyed. Along with the birds, there are frogs and turtles.

Social Impacts:

The site has spaces that provide areas for exercise, outdoor activities, and places to relax after a long work day. There are signs throughout the park that educate the public, and there has been a recorded number of visitors that is increasing every year.

Economic Impacts:

The park brings in about \$5.82 million in every year. The expected increase in the watershed of the residential community is over \$152.3 billion.

TYPOLOGICAL RESEARCH

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William G. Milliken State Park, Phase 2 Lowland Park

The park benefits the community in many aspects. The landscape architects of SmithGroupJJR created an escape within the community for wildlife along with the public. The park not only cleans the contaminates, but now provides a home and habitat for birds that stay year round and migrate through. Not only does this increase the bird population, but it increases the knowledge of those who visit the site with the educational signage.

The study of this project has proven successful that a park can educate and increase habitat of a species. The site cleans contaminates and recreational aspects lure the public in to enjoy the space. I will use this case study as a guide for taking an industrial site and re-purposing it into a natural wetland river front area.



(Left image) Figure 1. Two students view the educational aspect of the park through signage while viewing the natural habitat of the site.

(Right image) Figure 2. A view of the wetland that connects the busy city with the waterfront.



TYPOLOGICAL RESEARCH

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Olympic Sculpture Park

Project Type: A waterfront redevelopment project with a cultural center

Location: Seattle, Washington

Size: 9 acres

The project remediates the contaminated soils from the preexisting industrial site. The whole project was covered with over 3 feet of fresh soil for a clean and fresh start. The site was designed with plants to create a storm-water system to clean the water runoff of the neighboring surfaces. The proposed plantings mimicked a typical landscape along the northwest pacific coast. Along with these native plantings is a large meadow that is a non herbicide and non pesticide zone. This meadow is naturally watered when it rains and is mowed annually. The rip rap along the shoreline of the site was reused for a small pocket beach that allows the visitors to interact with the water. The park uses small signs throughout to educate the public with native plant names including descriptions of the roles the plants play.

The site is connected to the downtown with a bike trail along with different paths that follow the continued shoreline. The park has a sculpture garden that focuses on management practices for the overall protection of the site.

Environmental Impacts:

The site has native plantings and creates a park with biodiversity. Juvenile salmon use small invertebrates from the ecological biodiversity as food. Along with salmon many other fish have made these shorelines their home. By having a meadow that is not irrigated it also conserves water.

Social Impacts:

The park has over 425,000 guests every year. The space gives the public an area to come and enjoy the fresh air and water.

Economic Impacts:

The park is completely volunteer based. The design saves money by using very little upkeep and maintenance.

TYPOTOLOGICAL RESEARCH

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Olympic Sculpture Park

The designer of the park, Weiss/ Manfriedi Charles Anderson gave Seattle a work of art. The restoration process, along with the connections to the city, have created a place for the public to enjoy the outdoors within the busy city. The educational aspects create a way to understand the plants and native species within the park. The pocket beach that allows water interaction and an artistic sculpture garden brings in many visitors every year.

I found this case study to be relatable to my thesis project. The park educates and connects the public to the native species through the use of signage as a way of educating. The park was once an industrial site and now has a native meadow and wetland area. The meadow consists of many wildflowers that attract pollinators and save water by being drought tolerant.



(Left image) Figure 3. The meadow creates a natural pollinator habitat along with educational aspects for the public.

(Right image) Figure 4. A view of the Olympic Sculpture Park along the river in Seattle.





TYPOLOGICAL RESEARCH

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The Study of Effective Ways on Educating the Public Toward Snakes

The case study describes effective strategies that can inform the public of wildlife in new ways. The study focused on ways of changing the attitudes of those being educated. Changing peoples perceptions, by making the experience towards snakes positive, was a creative way to introduce the idea that this creature is not scary.

The objectives that were focused on, were ways to change the attitudes of those being introduced to snakes. The researchers who did the study used a method of predicting the best way to educate the public. By helping the educators better understand the effective ways of teaching those and interpreting the most effective way of communicating the information being given.

Program Elements:

1. Simple Exposure
2. Modeling the Species
3. Coming directly into contact
4. Informing those being educated

This particular case study shows how viewers can be educated by wildlife through simple steps such as; simple exposure, modeling the species, coming into direct contact, and being informed. This particular study has shown me many ways of educating the public on a species they are unsure of such as a snake, in my case the bees. By understanding and being able to learn about them, I feel that my river front can be successful in educating the public on the bees and preventing the visitors from being afraid. Those fearful of pollinators will realize the importance of bees by these interesting ways of learning. The public will gain respect for the bees and pollinators from the new ways of overcoming these fears.

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TYPOLOGICAL RESEARCH

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The idea of simply exposing the object, or snake in this particular study helped the educating process. By revealing the creature to those being educated, changed peoples perception of the creature and attitudes towards it. Those who were exposed had an improved attitude toward the creature they were exposed to. The attitudes were much more positive overall. Some people who have are snake-phobic had improved attitudes after being exposed to the snakes multiple times. By seeing the creature more than once, they were more open to snakes and less afraid.

Modeling the object by someone who is liked by the group created a positive engagement. Those being educated only observed the object instead of directly coming into contact with it. In order for the modeling to create a positive attitude, those being educated must be able to believe that they could relate to the educator and the same positive experience could occur if they were the one handling the snake. There must also be evidence to the audience that there are more benefits than there are costs. Those being educated must also see this modeling experience as a very positive action. When those who modeled the snake showed no fear and proved effective knowledge, those with the snake-phobic fears were more likely to have a better experience and positive attitude after the viewing.

Direct contact is one of the main ways of learning and creating a positive rewarding way of understanding the object. By being able to touch the snake many people who disliked the snake before touching it had a positive experience changed their negative thoughts to positive attitudes. Direct contact and positive experiences go hand in hand when learning about the object and becoming less afraid of the snakes.

When the audience is given information that reinforces a positive yet persuasive engaging message their attitudes turned to a more trustworthy perspective. Because of the many factors involved with how one receives the data and the different types of personalities many of the results for this were mixed. When the educator gives the information and uses facts, many of those being educated felt as if they gained knowledge and had a positive attitude toward the snakes.



THE PROJECT EMPHASIS

Bees are the major pollinators and do over 70% of the pollinating between birds, butterflies, and other types of pollinators. We rely on them to pollinate everything from almonds in California to our flowerless trees in our front yards in North Dakota. What would our city be like without them? What could our city be like if we planned for bees? Within the past ten years, a city in New York had banned beekeeping which caused vegetation and green devastation. After the damage was done, measures were taken to get bees back in the city. This is one example of what can happen if we do not realize the importance of the bees and pollinators. When our vegetable gardens stop producing tomatoes and we do not get any fresh corn in the fall, will we finally realize how important our bees are? Most people do not realize the importance of bees in a residential community. Bees are usually tied to agriculture where the idea of 'out of site out of mind' comes into action. People do not realize that bees are just as important within our community. It is simple to shop at a grocery store for fresh produce but most do not understand the process that it goes through to get there. People need to be educated and bees and pollinators need to be welcomed into our communities, parks and everyday life.

1. Help the public understand the importance of bees and pollinators.
2. Create a location that attracts pollinators and gives them a safe sanctuary that fulfills their needs.

MAJOR PROJECT ELEMENTS

Bees are number one priority in the pollinator paradise. The major pollinator elements will be key features to educating and providing a sustainable habitat for the pollinators.

1. Pollinator Plant Species

The plants chosen to be planted on the site are a key attractor to the pollinators. The species must encourage the pollinators to come and pollinate the plants. The eye catching plants that are native to Los Angeles, CA will be a major element in the pollinator paradise.

Riverfront Plant Species

The plants closest to the water of the river will need to be tolerant to salt water conditions. These specific plants will also help clean the surface runoff and aid in the storm-water system that is to be proposed in the site.

2. A “Green” Highway

The pattern of the plants must show planting connectivity. The idea of a green native pollinator highway ensures that the plantings will carry on in an unending wave.

3. Bee Hives and Hotels

An educational aspect along with encouraging the bees to stay on site is to create a hotel or have a bee hive placed within the park. This ensures that bees will stay and pollinate the area.

4. Educational Signage

The public is to be educated on the importance of bees. Planned tours throughout the day will create positive attitudes. Although there are other ways of educating, simple signage will help inform the public on plant species and their importance to pollinators.

5. Interpretive Trail and Boardwalk Bridge for River Access

The interpretive trail will include signage along it while a structured boardwalk will connect the opposite sides of the river.

7. Storm-water Treatment

The Los Angeles River catches a lot of the surface runoff of the area. Creating a storm-water treatment plan will increase the water quality and pull the contaminates industrial surface runoff.

USER / CLIENT DESCRIPTION

The users of the pollinator paradise include those who come to the site as tourists and also those from the Los Angeles, California area. This may include people who are escaping the busy work day to come to a waterfront area, or a group of children who are visiting for a class field trip and experiencing the educational aspect of the park. As there are many historical features to the Los Angeles River, I feel many will travel to the site to view the re-purposed area.

The projects main focus is creating a park that becomes a place for bees and pollinators to make their permanent home. In order to do so the bees and pollinators become the client. Pleasing them and educating the public on their importance is the goal of the project. The other client includes those who are being educated. Many people fear bees but with the correct ways and informative guides, the public can learn to have a positive attitude toward the bees and pollinators.

THE LOS ANGELES RIVER

The Los Angeles River is currently a large concrete ditch that runs through the middle of the city. It was built by the Spanish, who were the first to settle within the city. It was the power source for Los Angeles's industrial plants and was used to transport objects through the city.

The river is a total of 51 miles long and 32 miles run through Los Angeles, California. The river creates 870 square miles of watershed.

The Los Angeles River Corridor is home to over one million people, according to the 2000 Census.

My specific site is going to be just a small portion of the large river region. Located near Rose Crans Ave about 5 acres of a linear strip along the Los Angeles River. The Pollinator Paradise will be located along here and connect the river with the community. The exact location of the park will be determined after I visit the site on the nineteenth of October. I am traveling to Los Angeles. Visiting the river will give me a strong understanding of where the need for this type of project can be used. The redesign of the hard surface concrete ditch will create a soft scape along the river while incorporating native species of LA.

GOALS OF THE THESIS PROJECT

ACADEMIC GOALS

1. Students will use my project as a case study to understand how people and pollinators can coexist.
2. Students will understand the roles of the bees and pollinators in a park within the community.
3. Encourage younger students to have a positive attitude towards pollinators and learn about their importance.

PROFESSIONAL GOALS

1. Encourage professionals to get on board with a positive attitude towards the bees and pollinators.
2. For professionals to consider choosing plants specific for pollinators and native species.
3. Prove that pollinators and people can happily coexist and encourage firms to design for both.

PERSONAL GOALS

1. Create a pollinator paradise and home for the bees and pollinators in Los Angeles, California.
2. Create a site where pollinators and people can live in harmony
3. To educate the public on the importance of pollinators.
4. To understand bees and pollinators and the plants that attract them for future use and replicating the project in years to come.

MAIN GOAL

Create a pollinator paradise and increase the pollinator population in Los Angeles, California.

GOALS OF THE THESIS PROJECT

In order to make this thesis project successful, there are goals that need to be accomplished. The proposed redesign of the river front will academically educate future students on the need for creating a place where the public and pollinators can live in harmony. This is also a personal goal as my intentions of educating the public with helpful signage, modeling and being simply exposed to the pollinators are the main project elements. I have a goal of being able to positively impact the attitude towards bees and pollinators along with those who visit the river front property. It is important that the professionals also take into consideration that planning and planting for pollinators can improve the overall population of pollinators. As landscape architects we can design to re-establish habitat.

I intend to use specific species of plants that attract and encourage the pollinators to remain on the site, making it their permanent home. As soon as this project proves to have a positive impact on the pollinators of Los Angeles, I hope to find that this study will be used in other parks across the world. The loss of habitat for pollinators is one issue why our bees are declining. My goal is to increase the population with the creation of a paradise for the bees and pollinators while educating and creating a positive experience for those who visit the site.

A PLAN FOR PROCEEDING

There is so much research to be done. I plan on researching the bees of Los Angeles, California. Understanding the way a colony works and how bees come together to form a hive is going to be valuable information for my project. Bees require a specific micro-climate and studying this along with creating a better understanding of their needs will increase the pollinator population of the site. The plants that attract the pollinators to the site is another important direction of study. Getting the pollinators to the site and constantly encouraging them to stay long term is a main goal.

The Los Angeles River has an interesting history, unveiling this within the inventory and analysis will bring it to life. Along with the history, the typology of the project will be further researched. Previous projects of redone waterfronts and the positive impacts of these sites will show how to potentially design the Los Angeles River. The site analysis will help me to understand the region, the neighborhood and the site in itself. Connections throughout the city are important as this will bring the public to the site.

I plan on using previous studies done by others who have attracted bees to their site. I also hope to do a small research project of my own this upcoming spring. I plan on placing pollinator plants on my balcony where I record the number of pollinators that visit the plants periodically throughout the day. The plants that attract more pollinators will be key in the design. The plants that will attract the bees will most likely have key features that will be eye catching for the bees and pollinators. This will help my study on plants and the types of species bees go for.

The process of my thesis project will be an overall great learning experience. I will learn more about pollinators and their importance to our community. I also look forward to learning about the native plant species of Los Angeles, California. Encouraging the public to reach out and understand how the bees positively impact our community is important for achieving the successful pollinator paradise.

A PLAN FOR PROCEEDING

History, Values of the design - Week 1-2

Research the history and learn about the sustainability aspects of the site. Turning a the Los Angeles River into a soft scape and a pollinator paradise is going to take a sustainability study.

Research of Bees, Sustainability and the Micro-climate for Bees -Week 3

Find Additional Case Studies to Support Research - Week 4

Research Ways of Educating the Public and Conceptually Create Signage - Week 5

Theory, Philosophy, and Principles of the Project and Site - Week 6-7

Inventory, Analysis, Site, System and Processes, and Program - Week 8-10

Visit the site and take an inventory, analyze the information and create a program. Understand the processes and system of the site.

Communication and Documentation - Week 11-12

Visually and graphically work on the design and the writing portion. Understand any problem solving that needs to occur.

Use and Management of the Plants and Vegetation- Week 13-14

Study the certain types of plants that will be included in the pollinator paradise and river shore.

Computer Application and Advanced Technologies - Week 15-18

Start working on the auto-cad concept of the site and graphically representing the project. After the auto-cad bring it into sketch-up and a program to render.

Evaluation-site Assessment, Pr-design Analysis and Landscape Performance - Week 19-22

Evaluate the pre-design plan and better understand how the designed landscape will perform.

Continue to Develop Model within Sketch-up and Lumion - Week 23-25

Complete Thesis Program Booklet and Add Additional Findings - Week 26-27

Layout Boards and Construct Model - Week 28

Practice the Final Presentation of the Thesis Project - Week 29

THEORETICAL PREMISE

Bees are very important to overall life on Earth. The decline is evident and through the understanding of what is causing this decline we can help to create a start to a solution. While researching I have come to the understanding that a conservation/restoration zone would positively impact the bee population of the Los Angeles River. By creating habitat and providing the pollinators with the native plant species they prefer, it will draw them to the site and allow them to stay.

Landscape Architects use the idea of rationalism and empiricism when understanding research to begin the beginning stages of a project. Rationalism is the philosophical idea of the belief of others opinions should have a reason and be backed with facts rather than just having an emotional connection. I interpret this as a way of understanding that there is an uproar to the bees decline, and by having done research to prove that there are many endangered and even extinct species which are not recognized could potentially cause a crisis. The idea of there being a rational reason, instead of just a feeling should be the base of knowledge. Empiricism is the philosophical information that comes from knowing about something because of the experience you have had. Many of the researcher components come from personal experience. Alike, my thesis has derived from my concern for the pollinator population.

The project emphasis includes me creating a home for pollinators within the busy city life of Los Angeles while revitalizing the per-existing Los Angeles River. The direction of research is based around pollinators and their importance.

LITERATURE REVIEW:

SEED MIX USE FOR RESTORATION BOOSTS BEE VISITATION AND HELPS RESTORE RARE PLANT

Landscape restoration projects are used to bring back the ecological services of a site where human activity has degraded the previous functions of the landscape. Most efforts to revive the site use native and non native grass species but this does not contribute to the pollinator population and to successfully restore there needs to be a diverse native planting palette. Having a diverse planting plan not only benefits pollinators but also wildlife and bird species.

Pollination plays an important roll in the plant community of restoration projects. About 60-96% of native species in a natural landscape require pollination in order to thrive. The most successful and prosperous ecosystems rely on the pollinator population. In order to have a bountiful pollinator population there needs to be a diverse local plant pallet. The dense planting of the flowering species along with a diverse community helps to attract pollinators. The rare species also rely on pollinators and many times the seed viability can be affected by the amount of pollination a pollinator receives. Being able to support rare species is critical to rare plants and should not be taken lightly. Landscape restorations projects should have many goals that include and promote pollinator communities and what they entail. This is important to successfully restore the landscape.

Many species of rare plants and animals have been found within the restricted areas of industrial areas including the Santa Susana tarweed, which was focused on in this particular study.

THE SITE

The Santa Monica Mountains is where this rare species, the Santa Susana tarweed, is located. Between the counties of Ventura and Los Angeles in California in the south. The site where most of these species currently exists, is the Santa Susana Field Lab (SSFL). SSFL is about 30 miles away from downtown Los Angeles, California. The location is between the Santa Monica Mountains and the Sierra Madre. The site is home to home to wildlife, such as mountain lions, and acts as a corridor for many other wildlife. It is the main home for the Santa Susana tarweed and the endangered species, Baunton's milkvetch.

The site was once a home for Native Americans, a cultural history, many artifacts were left on site. The site was also a rocket engine and research site for energy. There were many new progressed advancements that were made to the current space programs on this site. Because of it's rich history, it is a National Registered Historic Place.

LITERATURE REVIEW:

SEED MIX USE FOR RESTORATION BOOSTS BEE VISITATION AND HELPS RESTORE RARE PLANT

The site is the prime location for the Santa Susana tarweed. The tarweed has adapted and is able to turn radiation into xeric. The tarweed grows on the hillsides where it is scrubby, in grasslands close to the coast. The plant prefers the Mediterranean climate patterns of the site and its prime location. The plant grows in the cracks of sandstone boulders and in more disturbed areas within the site.

The Santa Susana tarweed is a very fragrant. It is a multi-stemmed perennial plant/shrub that gets about 3 ft tall and can spread as wide as 9 feet in diameter. The bright yellow blooms of the flowers show up in July and can continue to bloom until September. The common pollinator to visit the tarweed is bees but it is also pollinated by other species as well. There are about 12,000 tarweed plants located throughout the 2,850 acres of the SSFL site. The testing and sampling was done on 62 plant individuals and were easy accessible.

THE STUDY

A Pollinator Partnership was brought onto the site to review the existing seed mixes previously planted on site and give suggestions on how the site could become more of a pollinator habitat. The suggestions led to additions to the existing planting and the new seed mix was included to add to the pollinator population. The particular seed mix was highly diverse and a couple grass seeds were included to mend the soil remediation. The site had six locations with dense plantings of the Santa Susana tarweed and this resulted in where the additional seed mixes would be added for the tests. The seed mix was planted to minimize and maximize the distances of foraging of native bee species. The average distance a native bee will travel is on average about 300 meters.

In order to better understand the pollinators importance to the plant a test was done to test the importance of the pollination on the seeds. Clusters of blooms from the plant were separated and had a see through material placed over them so they were unable to be pollinated but still were able to have sunshine. The rest of the plant was uncovered and able to be pollinated.

As soon as the seed heads outside of the bag showed signs of dispersal, it was a natural indication that they were mature and the seed development was complete. The seeds were then collected and the covered parts were also collected. The seeds were placed in specific bags that represented location from seed mix patches and whether they were covered or not. After the seed samples were collected, they were sent to a Seed Lab at Oregon State University. The seed viability was tested on a minimum of 200 seeds per sample bag.

LITERATURE REVIEW:

SEED MIX USE FOR RESTORATION BOOSTS BEE VISITATION AND HELPS RESTORE RARE PLANT

BEE VISITATION RATES

A standard visitation count was collected by the researchers. The standard protocol for the sampling set was collected from all of the locations. The researchers documented the pollinator action of a plant for 5 minutes periodically throughout the day, choosing different plants each time. After the 5 minutes were up the researchers switched plants and then continued to do this in the morning and evening. Counting a total of 40 minutes of recorded visitation and collected data per day and per sample field set. The data collection began when the tarweed began to bloom in august until the middle of September.

The bees that visited were identified visually and fell in the categories of: honey bee, yellow faced bumble bee, sweat bee, small sweat bee, green sweat bee, leaf cutter bee, long-horned bee, potter bee, mining bee, and small carpenter bee.

The covered seed bags were compared to those that were not covered by how they depended on the pollinator visits and seed viability. The pollinator visits to the Santa Susana tarweed that were located close and far from the seed mix planted zones were compared. Comparisons were also made from the certain type of bee as the individual species. The relationships between the amount of visits and the seed viability were also viewed and studied to better understand the trends of the seeds and their production.

RESULTS

After the research was complete, it was clear that the rare plant, the Santa Susana tarweed, relied heavily on the pollination of the pollinators. The seed viability test proved that the numbers were much higher when pollinated. The native bees showed very similar results to the plants closer to the seed mix field and visited these sites more. The results of the common bees were also very similar in the near and far plants. The leaf cutter bee favored the far sites and were the most common to be found at the farther plants from the seed mix. The bumble bees on the other hand favored the plants that were closer to the seed mix fields and were less common at the plants farther away. The seed viability charts by the leaf cutter bee were very confidence with a level at 90%. This means that the leaf cutter bee is a very functional pollinator of the Santa Susana tarweed.

LITERATURE REVIEW: SEED MIX USE FOR RESTORATION BOOSTS BEE VISITATION AND HELPS RESTORE RARE PLANT:

SUMMARY: PLANT-POLLINATOR IMPORTANCE IN RESTORATION

This study has led me to determine the importance of pollinators and plants in a landscape restoration project. Some rare plants rely strongly on pollinators to reproduce an abundance of seeds and thrive. This study has shown me that there are very positive impacts when pollinators are included in restoration processes. In order to fully get the land reclaimed back to its natural state there needs to be a natural pollinator community included.

The Santa Susana tarweed thrived when it was located near mix seeded restoration areas because of the pollinator abundance. The plants that were covered produced far less and proved that the rare species is very dependent on the pollinators. The plants were visited by many different types of pollinators but the one that was most common was the bee. It can be assumed that the plant relies on the bees and the key pollinator for the plant is the bee. Some bees only preferred the close plants to the restoration area while some preferred the farther plants but the overall numbers were very similar.

The fragmenting of landscapes poses a great threat to pollinator populations. With the loss of habitat, the pollinators are having a smaller presence and are unable to thrive in the landscape. Pollination services have shown positive impacts on both wild and different type of managed landscapes.

In order to successfully restore a landscape, the pollinator needs should be strongly considered. Native plants play a huge role in the success rates of the pollinator habitat. Having a large floral base of flowering plants that bees and pollinators do not prefer will not attract pollinators and the plants they prefer should be taken into consideration. The ecosystems need to be functional and close with dense plantings. Certain plants pose as a pollinator magnet and these are key when trying to attract pollinators to a site. There are other plants that play the role of a supportive species that keeps the bees motivated to pollinate that area. Understanding the different seed mixes and restoration processes is key. The different species should be diverse with a mix off different types of appropriate forbs. This may be more expensive but the outcome is more than worth it.

LITERATURE REVIEW:

THE CONSERVATION AND RESTORATION OF WILD BEES

Bees are the main pollinators for most ecosystems. About 90% of the floral species within the world requires pollination. There are many types of pollinators such as different species of butterflies, flies, birds, and mammals of all types that pollinate, but bees have proven to be the number one species in flower visitation rates. Unlike the other pollinators, bees rely completely on flowers and are known as florivores. Throughout the bees life cycle they rely on the floral products as larvae until they are adults. The bees use the pollen and nectar as a vital source of food.

Bee numbers have been declining over the past half century. The cause of many colonies collapsing is the Colony Collapse Disorder. Most wild, native bees have suffered from habitat loss and pesticide usage. Through the study, the idea of allowing these native pollinators and wild bees to pollinate crops may be a method that is sustainable. Through research wild native bee species have been shown to be equally effective as honey bees in pollinating many different crops.

There are about 20,000 different types of bees and they are a very diverse species. Bees numbers have been found to be low in the tropical areas in the world but prefer temperate arid areas such as the southwestern United States and the Mediterranean. Most wild bees are ground dwellers and make nests in the soil. The tropics have high temperatures and lots of rain that would flood the nests and the larval would be susceptible to funguses. The eusocial bees that are domesticated are found more abundantly in this region. The same goes for the dry desert areas. There has been found a higher eusocial bee diversity in these areas because wild bees have been found to prefer longer flight distances. Solitary bees also like continuous bloom and the desert tends to have patchy, sporadic plantings.

BEE DECLINE AND THE CONSERVATION STATUS

The lack pollinator monitoring has made it difficult to follow the exact bee decline and what species are currently endangered and have gone extinct. The European Union has done the most research on this issue and this gives evidence of large declines. Areas with more intensive human used areas have shown that there is less bees. The bumble bees are one of the species that have had the most studies done and they have been globally put on the endangered species list. Over 11% of the bumble bee species as a whole should be put down as “near threatened”. (Winfree) The main causes of these extreme declines in the species is due to the intensification of the agriculture that has taken place over the past century.

LITERATURE REVIEW:

THE CONSERVATION AND RESTORATION OF WILD BEES

The forage plants favored by the bumble bee are at a low due to this agriculture intensification. When the native plant species of the area and grasslands along with areas for prime habitat are developed, the bee population along with other pollinators suffer. The chemical sprays that now cover the agricultural areas are less pollinator friendly. Synthetic fertilizers are used instead of clover as a crop to cover the field to restore the soil compounds.

The bumble bees have declined over all and some are very close to extinction. One of the reasons for this close extinction is due to parasite infestations. A fungal pathogen that was introduced from Europe has spread quickly throughout North America has made a large impact on the commercial bee populations.

THREATS TO THE BEE CONSERVATION

The main causes to the bee decline are loss of habitat, diseases and parasites, and the changes in climate. These are also reasons for the causes of other pollinators decline. Habitat loss is affecting many different species. It currently is the number one reason for animals and insects facing endangerment. With the devastating loss of habitat comes the loss of wild bee species diversity. This richness in diversity is important because of the specific pollinators roles. Although the bees face habitat loss from most cases of human-development, some species are doing well and still thriving. Suburban gardens and native perennial gardens pose as a pollination station and can potentially provide for some bee species. The agricultural lands can also be less of a threat if they are not as intensive as most. The bees can make use and find habitat with the less intense agricultural land. Small habitat areas within the human-disturbed land can benefit these declining species.

Climate change is impacting the bees and could potentially cause large massive extinctions in the species. Bees rely on migration and regional temperatures affect the native flowers. If the flowers bloom time does not meet up with flight patterns of the bees this could affect the feeding and pollinating of both the flower and bee. If the bees can not keep up with the changes in the climate the results will be devastating.

LITERATURE REVIEW:

THE CONSERVATION AND RESTORATION OF WILD BEES

By introducing non native pollinator and plant species, the bee and pollinator population is threatened. Invasive species can pose a threat and over populate native areas. When a new species of bee or pollinator is brought into North America, the species can carry parasites and diseases that negatively impact the native species. The spread of parasites from commercially owned bees to native bees is posing as a threat. During the period of fertilization of crops many bee hives are closed off and not released during this time because exposure to the chemicals can be devastating. The chemicals still affect bees negatively though because they can not be closed off and unexposed. Most fertilizer companies have tried to create solutions and prevent this issue. The chemical does not kill the bee but affects the foraging and makes the bee confused as to where the hive is located. The longer the bee is away from the hive the less likely to make it back alive.

The bee species is completely dependent on the usage of flowers and the flowers also rely on the bees. When one suffers the other suffers as well. The whole pollinator group is vulnerable because of many factors and plants suffer when there are no pollinators. The plant-pollinator network is crucial to the species survival.

BEE COMMUNITY RESTORATION

The majority of conservation projects for the bee species are due to agricultural purposes. The government plays a large role in funding. This exists because of the need for agriculture pollination. Wild bees offer a vast network of diversity and can also pose an impact to the agricultural development. Conserving pollinators increases the crop pollination and benefits the land use. There are economic values of wild pollinators that play an important role in the entire ecosystem.

The best way to design for a successful restoration is to understand the bee species and the pollinator population of the chose destination. Bees have many needs in order to thrive. By filling these needs, we can ensure an abundant diversity. It is important to provide nesting. Leaving bare-soil, open areas, fallen branches and other materials to dwell into, the native bees are able to make a home. Restoring the native plants of the areas, provides pollen and nectar to supply this vital food source. Providing a diverse mix of native perennials the pollinators are able to successfully thrive.

THE CONSERVATION AND RESTORATION OF WILD BEES

STUDY

The study focused on how rich species were during different seasons and what plants were dependent on the pollination. The study took different plots of organic farmers and counted the numbers of bees that visited the fields. The research also focused on what type of landscape bees preferred in restoration cases. The effectiveness of the type was dependent on low and high visits of pollinators. The interaction between types of landscapes and their environmental effectiveness showed where restorations should be done at.

RESULTS

According to the study, there was a happy medium between cleared land and very complex land as to effectiveness. The land that did not have enough development had a low effectiveness as to bee visitations and the land too complex also showed a low percent of effectiveness. The highest effectiveness was the type of landscape that was much more simple.

The agricultural context will prosper with restoration zones nearby. Plants and pollinators are dependent on each other. The pollinator restoration is supported by the vegetation restoration. Riparian fragmented areas and restored sites have shown to have very parallels in the numbers of bee abundance and the general pollinator population was rich.

THE CONSERVATION AND RESTORATION OF WILD BEES

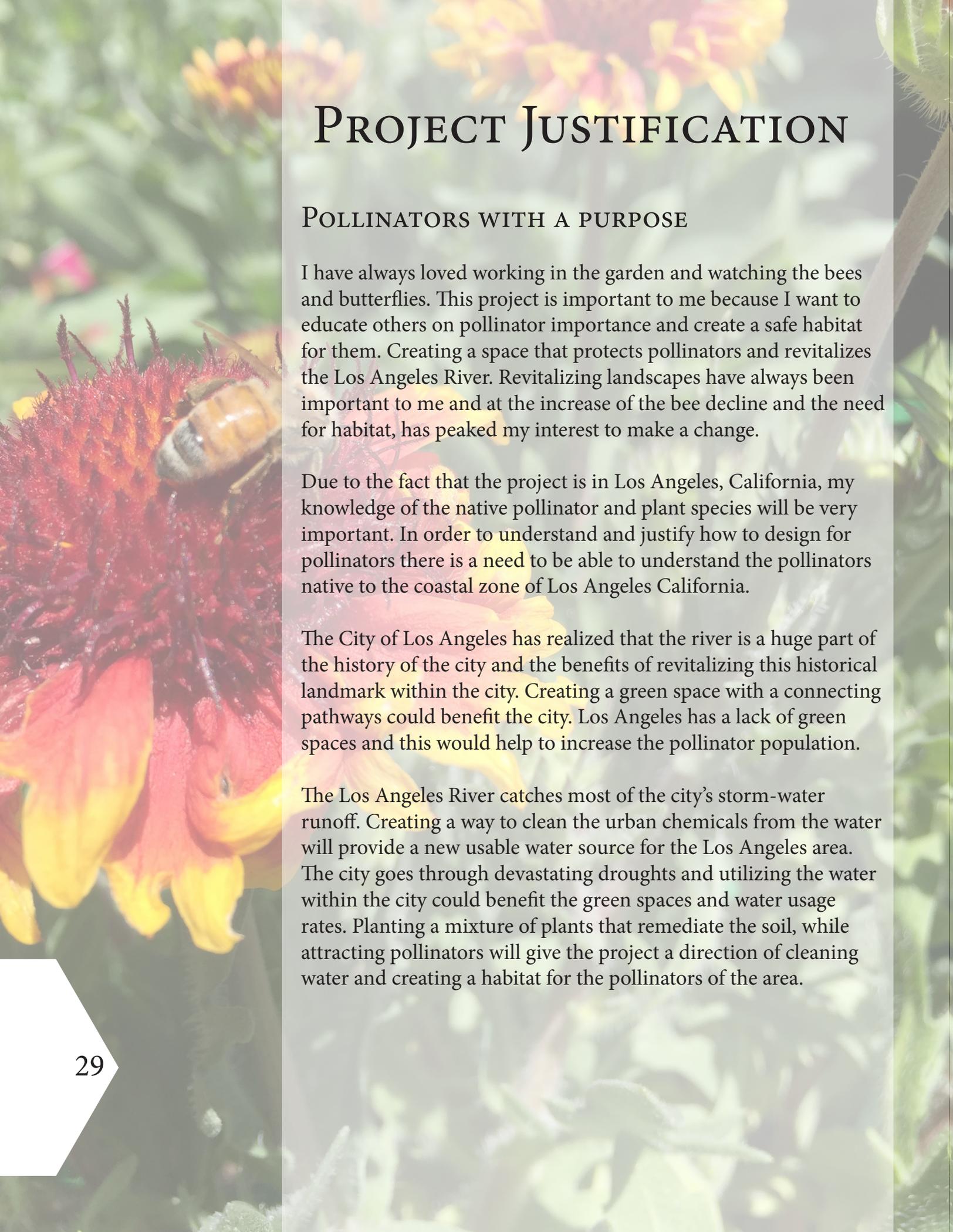
SUMMARY

There are many reasons for planning for restoration and conservation practices. These include the survival of the diverse native, wild bee population along with the abundant commercial bees. Bees completely rely on the plants and plants on bees. It is important to keep one in order to have the other. Without plants, there would be no fruit or vegetables and therefore great devastation would set in. This is just a small example of how important the bee and pollinator population is to the survival of the human species. The fast growing urban areas along with other human developed areas has been the leading cause for the great bee decline. By destroying habitat and not creating a space for bees to nest it threatens their survival. Many native bee species are ground nesters and by destroying habitat we destroy threaten their existence. Along with the habitat decline, the bees are also threatened by the exposure of new species, parasites and diseases.

We should not only restore and conserve landscapes for pollinators near intense agriculture areas but also within our communities, because of their importance to the ecosystem. Some bees have been able to thrive within the community and others have greatly suffered. Bees rely on diverse, patchy plantings and most residential gardens include these features. The perennial gardens planted throughout the city usually are planted clusters and have native species. Although these plantings can sustain some bee species many have yet again, suffered from the loss of habitat.

By going more in depth and taking the time to understand the native species we can plan for their re-establishment and survival, instead of their decline. The wild bee species is a very poorly studied species, whereas the bumble bee has much more data and the records of decline have been more accurately measured.

I have taken many important lessons from this research article. The importance of understanding the bee decline and being able to do something about it, is key. This has shown me that although many bumble bee species have been researched there is much more data to be collected. Although the data is patchy there is still an obvious bee decline and preparing to conservation sites could help solve the issue of many native, wild bees from going extinct.



PROJECT JUSTIFICATION

POLLINATORS WITH A PURPOSE

I have always loved working in the garden and watching the bees and butterflies. This project is important to me because I want to educate others on pollinator importance and create a safe habitat for them. Creating a space that protects pollinators and revitalizes the Los Angeles River. Revitalizing landscapes have always been important to me and at the increase of the bee decline and the need for habitat, has peaked my interest to make a change.

Due to the fact that the project is in Los Angeles, California, my knowledge of the native pollinator and plant species will be very important. In order to understand and justify how to design for pollinators there is a need to be able to understand the pollinators native to the coastal zone of Los Angeles California.

The City of Los Angeles has realized that the river is a huge part of the history of the city and the benefits of revitalizing this historical landmark within the city. Creating a green space with a connecting pathways could benefit the city. Los Angeles has a lack of green spaces and this would help to increase the pollinator population.

The Los Angeles River catches most of the city's storm-water runoff. Creating a way to clean the urban chemicals from the water will provide a new usable water source for the Los Angeles area. The city goes through devastating droughts and utilizing the water within the city could benefit the green spaces and water usage rates. Planting a mixture of plants that remediate the soil, while attracting pollinators will give the project a direction of cleaning water and creating a habitat for the pollinators of the area.

PROJECT JUSTIFICATION

In order to enhance the pollinator population and receive funding for the project, there needs to be a reason for funding the proposal. The proposed pollinator museum will create a sculpture park along with having an educational purpose. By educating the public, it will ensure that those visiting will feel safe while viewing the pollinators. Visitors will feel less threatened if they understand that the pollinators will not harm them. This also creates a space for the community and school children to enjoy a green space while learning about the importance of pollinators.

The introduction of a new green space will not only increase the pollinators of the site, but also the pollinators of the area. Pollinators have a large travel distance, but this is limited by the plantings within their travel distance. Pollinators require a diverse plant palette but dense clusters of similar plantings. Providing for their needs and creating a habitat for them, I am increasing the pollinator population in the Los Angeles area.

HISTORICAL CONTEXT

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THE LOS ANGELES RIVER

Before the flood, the natural Los Angeles River flowed freely through the city. The first settlers in the late 1700s were the Spanish. One of the main reasons the Spanish were attracted to this southern location in California was due to the fact of the river. The water would supply their needs. The small village that the original settlers made their home soon grew to the huge population of over 100,000 occupants by the year 1900. The city planners were concerned with the amount of water the city was using so they decided to take steps to create a meter. This was a successful process and reduced the per capita. This worked for a while but once the population kept increasing he shortly searched for something new. Eaton was the one found a river about 250 miles away from LA, the Owens River. The Owens River collected the water melted from the snow from the mountain range, the Sierra Nevada. There was no way of the water moving through so the water stayed in the lake where it became a saline water source. The idea was to be able to keep the water flowing while it was flowing to keep it fresh and have it flow towards Los Angeles. The Owens River that was also known as the Los Angeles Aqueduct. The aqueduct was used as a valuable water source because the city of Los Angeles was growing at such a rapid rate. This was the first aqueduct to supply water to the city on a large scale.

The extreme city growth caused Landscape Architects, such as Frederick Law Olmsted Jr., and Harlan Batholomew to propose a parkway system along the river, it would include vast parks, wetlands, with a downtown connection. The proposed plan was not carried out because many considered the river as a scar on the land. Many industrial plants located along the Los Angeles River used it as a dump and therefore made it quite an eyesore.



Figure 5 & 6. The natural Los Angeles River in the early 1930s.

HISTORICAL CONTEXT

THE LOS ANGELES RIVER

The Los Angeles River was always prone to flooding and usually flooded outside of its banks. When residents started filling into the flood zone as the city grew. During the 19th and 20th century the flooding became a major issue for the City of Los Angeles and the City Board decided to build dams within the Sierra Nevada Mountains to slow the snow-melt runoff and catch the particles that flowed with the water.

In the 1930s two horrific floods occurred in Los Angeles due to the river. The worst one was in 1938, record breaking rain records caused the flood. Los Angeles had a storm that lasted 5 days that had over 10 inches of rain. There were 49 people that died, thousands were forced to leave their homes and head for higher ground. During the flood over 98 homes were ruined and about 110,000 acres of land. One-third of Los Angeles was completely flooded. The river was completely changed, new inlets and outlets were created. This caused the Government to step in and take action. The flood control program continued to build dams in attempts to manage the runoff from storms and runoff.

The large storm had completely killed the power and the city was cut off for 2 days. The Army Corp of Engineers was used to protect the city and Olmsted's green-ways and wetland park plans were pushed to the side and forgotten. It was decided that the Los Angeles River would become a concrete ditch between the years 1934-1959. In order to cover the river, it took over three and a half million barrels of cement to complete the project.



Figure 7. The devastating damage done by the floods in the 1930s.



HISTORICAL CONTEXT

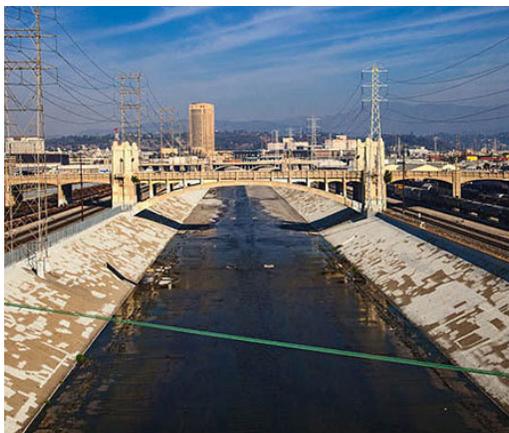
THE LOS ANGELES RIVER

The natural river was transformed into a water freeway. The water could flow as fast as forty-five miles per hour. The concrete did not allow any natural spring water to get into the riverbed. The idea of having a full concrete river that was a water free way shortly became dry during the summer.

During the nineteen fifties people even began using the river as a alternate freeway. The river became known as the “poor man’s freeway”. Car companies even began using the river as a way of testing their new models.

A few plants released sewage into the concrete channel and this now represents a large slide into the river. This pushed the illegal measures and now is not allowed. About 6 people drowned in the river per year. During a heavy rainfall many people would get swept away in the river and only a few would get lucky. The dams that were built to prevent the flooding become “drowning machines” during a flood.

The Los Angeles River has been known as one of the worst places in the city, but lately there have been movements to revitalize the river. The first notion to improve the river was the Los Angeles River movement which has turned out to be very successful. The issue is to use the river for multiple things such as habitat, improve water quality and control the flood. By improving the Los Angeles River’s water quality the city can begin to prepare for the future need of water, because of Los Angeles’ growing population. Greening the river and improving the overall water quality is the cities goal.



(Left image) Figure 8. The current Los Angeles River after a rainfall.



(Right image) Figure 9. The poor man’s highway during the 1950s.

HISTORICAL CONTEXT

THE TAYLOR YARD PARCEL

The Taylor Yard plays an important role to Los Angeles's history. Los Angeles and the state of California was originally home to the Tongva Indian tribe. The Taylor Yard is the actual site that was described and recorded by a man on the Portola expedition and where the men spent the night after arriving the Arroyo Seco. The words that described the area was a "green, lush valley" and this area had beautiful native grape vines, with other plants such as sage and roses. The rich soil provided for these beautiful species. There was also an abundant amount of wildlife. The species included: grizzly bears, antelope and quail, along with trout and many fish in the rivers. In the year 1781, the Pueblo people started their home down the river a ways on the bank.

In 1850 the state of California was admitted into the Union. Shortly after the land was divided and sold, most of the land was consumed by agriculture and settlements. The Taylor Yard site was owned by J. Hartley Taylor in the late 1890s and had a Taylor Grocery along with a large milling company that processed feed. J. Hartley Taylor had started his own farm and raised oat, barley, hogs, and pigeons along the rich banks of the river. The Taylor Yard had homes built on it during the 1920s that were destroyed in the flood and shortly after in the late 1930s the river was completely covered in concrete.

The large Taylor Yard Parcel is about 250 acres, and was owned by a railroad company, the Union Pacific Railroad Company. Due to the large railroad company and industrial development the site now has over 10 ft of contaminated soil. The city recently purchased the Taylor Yard Parcel G2 and plans are being made to create a large green space for the City. The beginning stages are focused on remediating the soil and cleansing the site.



(Left image) Figure 10. Proposed concept design for Taylor Yard, completed by the city.

(Right image) Figure 11. The current deserted Taylor Yard Parcel G2.

PHYSICAL CONTEXT

THE LOS ANGELES RIVER & TAYLOR YARD PARCEL G2

The Taylor Yard Parcel G2 is adjacent to the Los Angeles River and in the prime location for an upcoming green space. It is south and west of the Los Angeles River. On the opposite side of the river is the Rio De Los Angeles State Park, east of the site. On the southeast side of the Taylor Yard Parcel G2 is the Metrolink's Central Maintenance Facility.

The Taylor Yard Parcel G2 is located in the Cypress Park neighborhood and right across from the very busy Frogtown Neighborhood. This site that is adjacent to the river was previously an industrial site that was owned by the Union Pacific Railroad.

The Taylor Yard Parcel G2 is about 43 acres. It is just one parcel of the whole. The Taylor Yard is made up of seven parcels. The parcels include: Parcel c that is about 24 acres, Parcel D that is 40 acres, Parcel E that is 8 acres, Parcel F1 is 27 acres, Parcel F2 is 23 acres, Parcel G1 is 18 acres and Parcel G2 is 43 acres. The last available space is the G2 parcel. The Parcel G2 has the potential to connect the Rio De Los Angeles State Park and the Bowtie parcel.

The Taylor Yard is about 3 miles northwest of downtown Los Angeles. The site is located at the base of the Sierra Nevada Mountains. This makes the site a prime location for a large green space. It would connect the busy downtown with a the Cypress Park neighborhood.

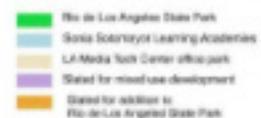
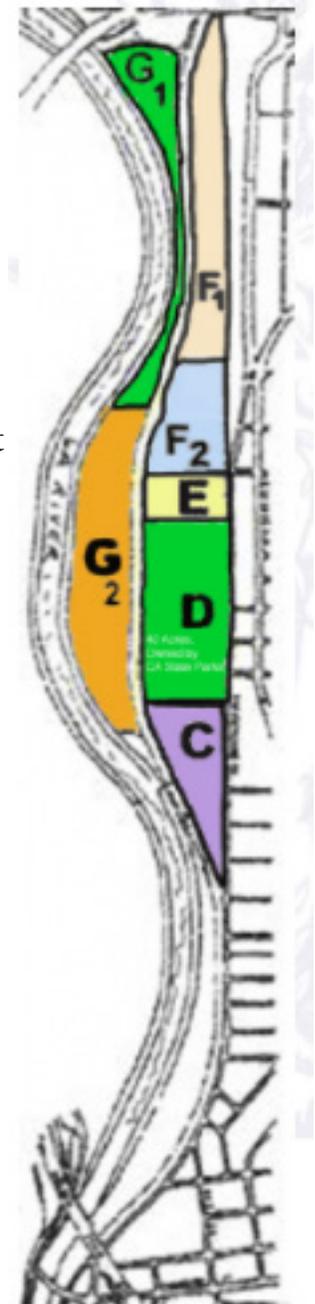


Figure 12. The parcels that make up the Taylor Yard.

SOCIAL CONTEXT

THE LOS ANGELES RIVER & TAYLOR YARD PARCEL G2

The city of Los Angeles has taken into consideration the importance of green spaces within the city. The green spaces have encouraged the city to realize the need for these spaces are a large part of a successful city. By having green spaces throughout the city it assists in cleaning the storm water.

By turning the Taylor Yard Parcel G2 into a green space it will have an impact on the peoples lives'. Green spaces throughout the urban areas of a city cause people to become more active.

The city has been looking at how the Los Angeles River can be a green efficient source of water. While the city is growing rapidly and the water shortage has become an issue there is an act to be able to use the river for more than just moving water out of the city as fast as possible.

The river has bike trails along it and many people use these because of the long trail system they provide. The bike trails run between the Taylor Yard Parcel and the Los Angeles River. By utilizing this system, it encourages the public to embrace the outdoor life. The river holds many historical values and whether or not the creating a concrete ditch was the solution, there are ways of making it more friendly and creating habitat.

The trend of saving the pollinators has started to appear across the nation. Designing a habitat for the bees, and trying to create a nesting space by providing a sanctuary will ensure a higher pollinator population.

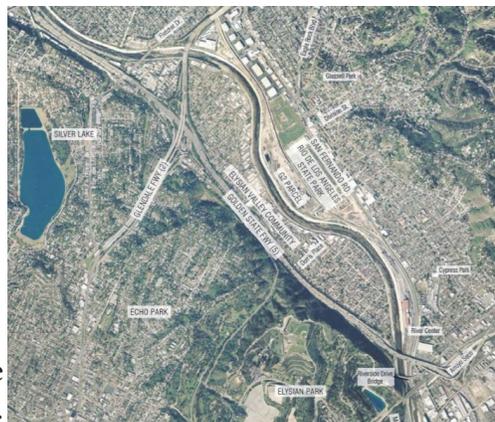
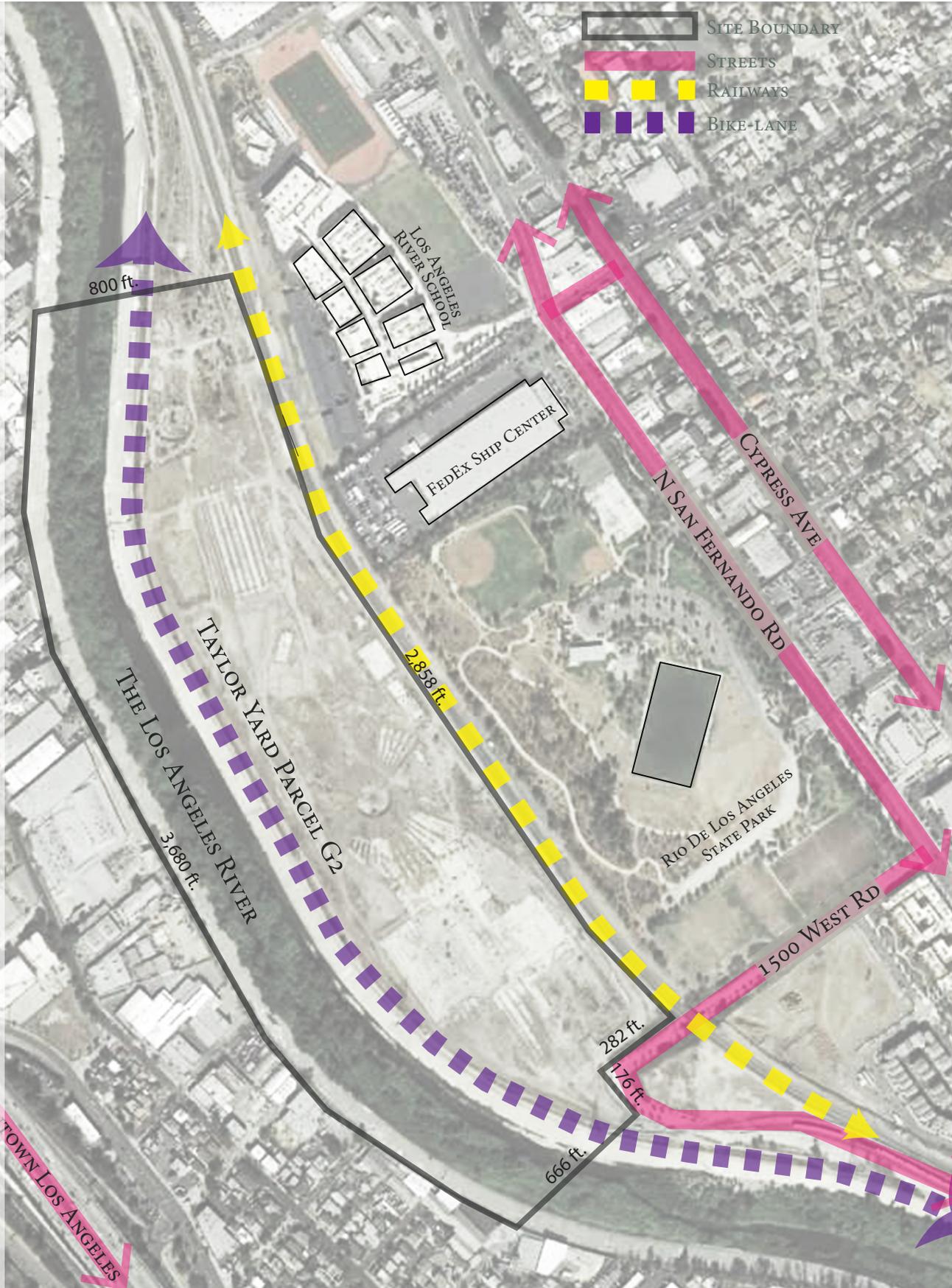


Figure 13. The Taylor Yard Parcel and the immediate surroundings.



TRANSPORTATION

The main roads that surround the site are the Interstate 5, Cypress Avenue, N San Fernando Road and 1500 West Road. These are a few of the key vehicular routes to the site. The Taylor Yard Parcel has a bike lane that runs between the site and the Los Angeles River. This is a key mode of bike and walking transportation. The parcel also has a railroad that divides the Rio De Los Angeles State Park and the Taylor Yard Parcel G2. These are used for understanding the transportation routes around the site.



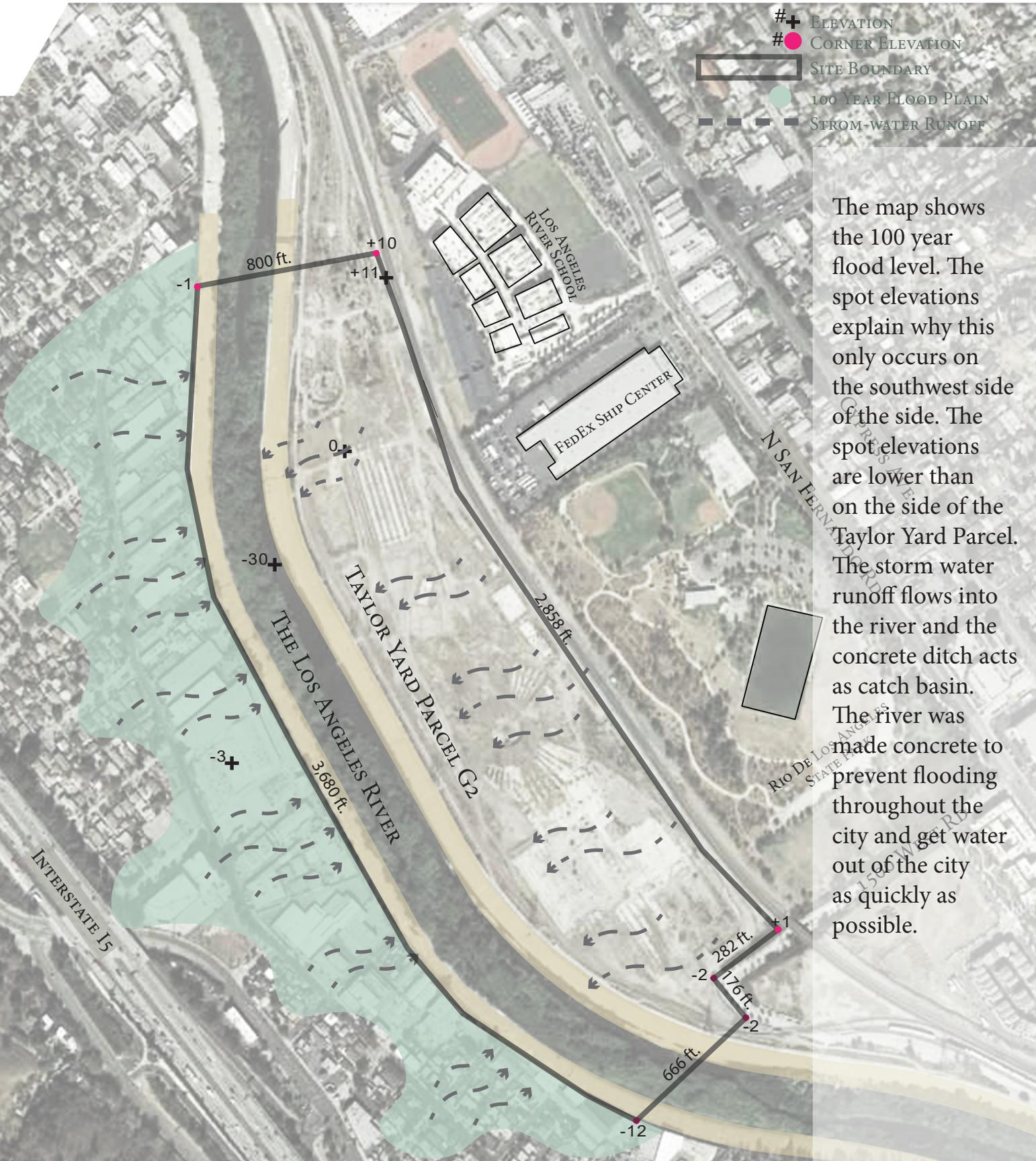
CONTAMINANTS & VEGETATION

The Los Angeles River has had sediment build up over the years which has caused a dense vegetation to grow in the river bed. This has not occurred in every part of the river but this section has the dense coverage because of the constant water. The Rio De Los Angeles State Park also contains most of the dense vegetation within the area.

The Taylor Yard Parcel G2 was previously a rail-yard and because of this the soil was contaminated with pollutants. These pollutants include: metals, petroleum, PAHs, and VOCs.



ELEVATIONS & FLOOD LEVELS



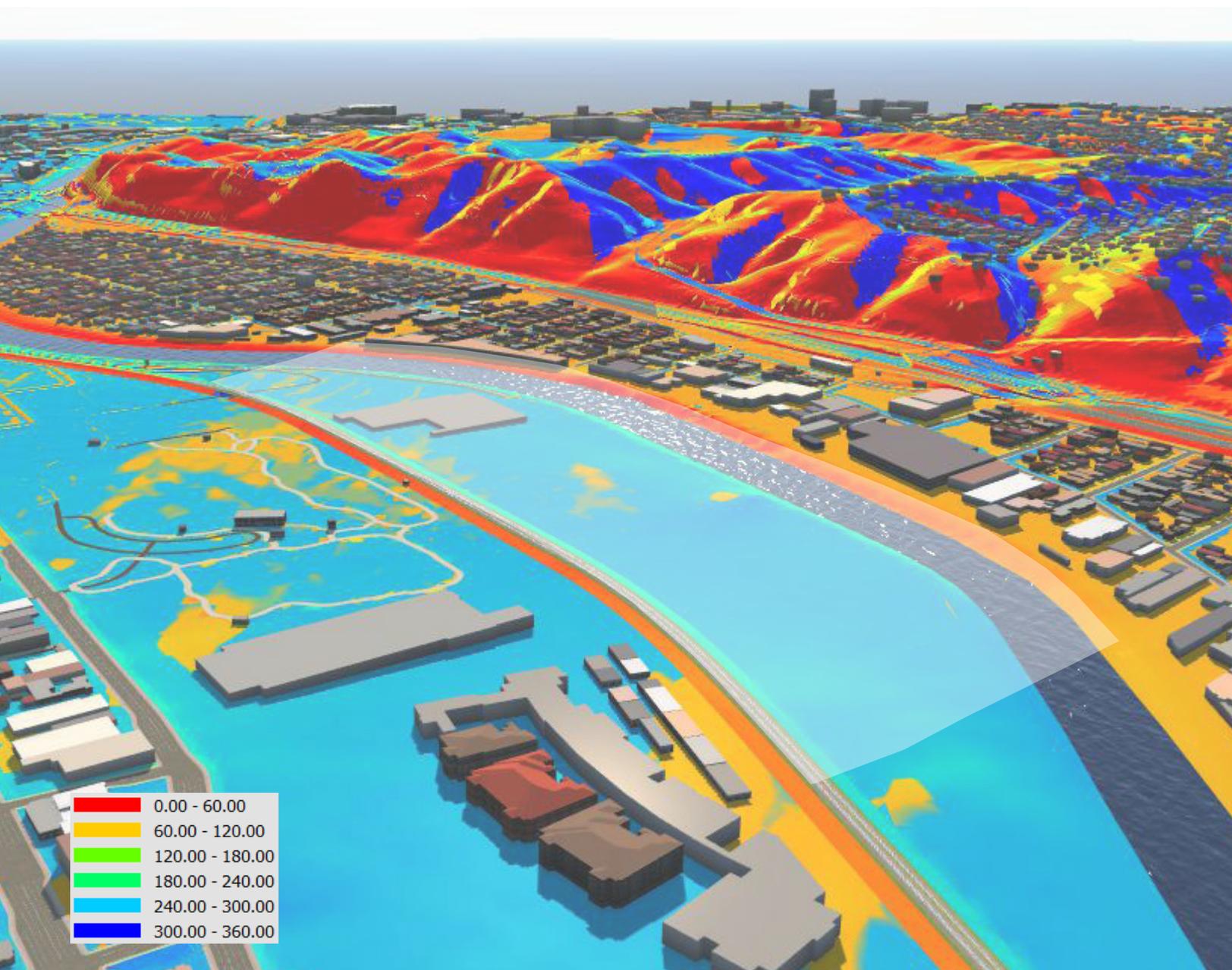
The map shows the 100 year flood level. The spot elevations explain why this only occurs on the southwest side of the side. The spot elevations are lower than on the side of the Taylor Yard Parcel. The storm water runoff flows into the river and the concrete ditch acts as catch basin. The river was made concrete to prevent flooding throughout the city and get water out of the city as quickly as possible.

GEOGRAPHICAL ASPECT

THE TAYLOR YARD PARCEL G2 AND LOS ANGELES RIVER

The map shows the geographical aspect of the Taylor Yard Parcel G2, the Los Angeles River and the surrounding area. The geographical aspect refers to the slope steepness and the downslope direction. Understanding the downslope helps analyze where the storm water runoff will flow to and show the areas where the runoff could potentially be dangerous in a storm that produces a lot of rainfall.

This map shows the location of my chosen site and where it lies between the State Park and the mountain range. The site has a 180-240 degree downslope.



SUN AND WIND PATTERNS

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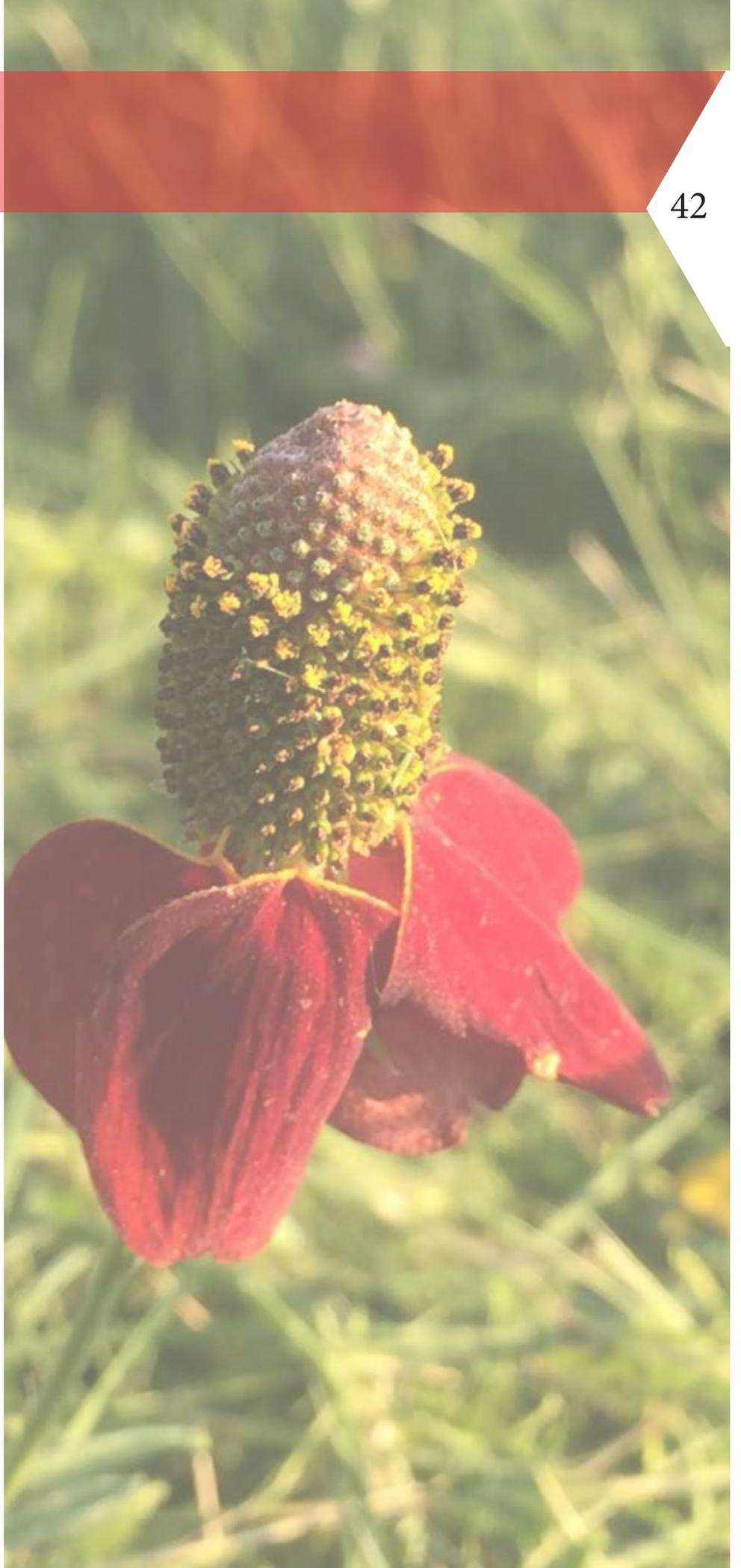
WINTER

The winter solstice shows that the sun remains more on the horizon. The top map displays the winter sun pattern and the shadows on the map are set up to show what the day sunlight would look like at noon on January 1st.

SUMMER

WIND

The summer solstice shows that the sun remains higher during this period. The bottom map displays the summer sun pattern and the shadows on the map are set up to show what the day sunlight would look like at noon on June 1st.



ANALYSIS SUMMARY

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The Los Angeles River has many key components that make it a unique site. The site has many roads that lead to the site. These analyze the best way to access the site is and help to determine where the site entrance should be located. According to the site elevations, there is only one place on the map that would have a key access point. The only ground level location is the southeast corner. This is also where the rail cars would enter the site from the previous rail-yard. The main high-way southeast of the site is how those who do not live in the immediate area will use to arrive on the site. The other streets such as Cypress and North Fernando Road are the roads that connect the near by neighborhood to the site. The railroad that runs in between the Taylor Yard Parcel G2 and the Rio De Los Angeles State Park restricts access. This is important to understand that the main access will be limited and a design solution will be needed to connect the two parks once completed.

By mapping out approximately where the heaviest contaminants are located at, the site can be better remediated. This area will help decide where plants that can tolerate these contaminants should be placed. The types of plants best suited for this area would be native grasses with deep roots. These plants are used in restoring soils and pulling the harmful pollutants out of the soil. In order to create a successful habitat the plants needs to be able to thrive and having harmful chemicals in the soil it prevents the plants from performing to their top potential. The native perennials of the zone 10a/10b thrive within the rich soils in this zone. When human development causes spills and degrades the soil condition it also scars the land as a whole. The remediation process will take time and will add to the budget but overall will benefit the entire site once the soils are cleansed.

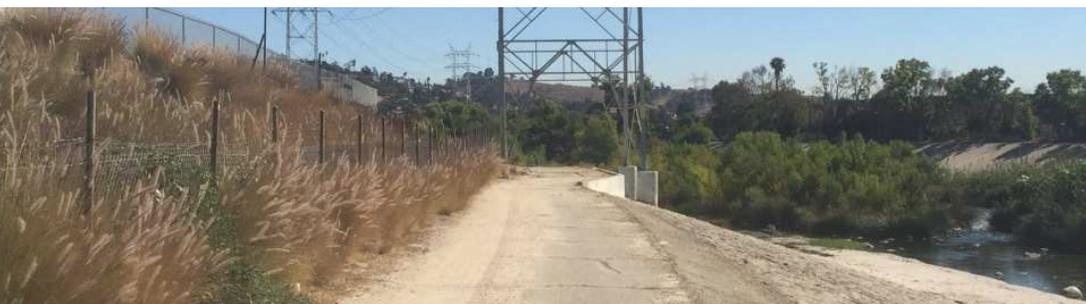


Figure 14. The bike path that runs between the Taylor Yard Parcel G2 and the Los Angeles River.



ANALYSIS SUMMARY

As mentioned before, the spot elevations play an important role in the design solution as it determined there is only one true access to the site for vehicles. The spot elevations also proved the reason for flooding toward the southeast. This area past the river is significantly lower than the northwest side. Picking certain spots along the site helped determine the high and low points on the site. The further north the higher the site it. The drainage of the Taylor Yard Parcel G2 drains into the river and by planting for remediation we can prevent a large amount of contaminants that enter the river from this site. The Los Angeles River catches the cities storm-water runoff. Creating a large green river park this is a step in the right direction for the city.

The geographical aspect also shows where the steepest slopes are off the site and the surrounding area. When heavy rainfalls occur the fastest predicted runoff will come from the mountains located to the southeast side of the river. It has also determined that the Taylor Yard Parcel G2 is fairly flat and the degree of slope is between 180-240.

Most native perennials in the zone 10a/10b require full sun year round and will not survive when temperatures fall below 40 degrees Fahrenheit. The plant species are going to play an important role in the pollinator paradise. They are the main attractors and are the reason for the pollinators to thrive at the proposed plan. The role of the sun and winds affect the plants and provide protection from these winds will help the more fragile species survive on the Taylor Yard Parcel G2.



Figure 15. The sediment filled Los Angeles River and the dense vegetation.

Performance Criteria

The types of things measured within my project will be the different types of materials used. The site is currently a brown-field industrial site and has many contaminants, it is important to figure on the measurements and how to treat the pollutants in the soil. The contaminants go at least 10 feet into the soil and have many solvents and hydrocarbons that contain petroleum.

The allocation of space will be divided into a few parts. The pollinator habitat, the pollinator museum and the educational aspect will play an important roll in the design. These spaces will be measured on popularity and how per-existing examples have performed.

Environmental performance will be measured on how complete the ecosystem is with the new pollinator habitat. As the spaces are divided and the new plants start developing, it is important to balance the spaces and create a successful habitat.

The usage patterns will be manipulated by the paths within the site. Having a pollinator habitat will only allow certain areas to be walked in and this will be measured on how active each path is and the stops along the way.

The more pollinators that will visit the site the more the existing areas will benefit. Pollinators play an important role within the community and understanding the new plant growth within the entire neighborhood will help us to understand the environmental impact.

The increase in visitors along with the educational aspect help with the project funding. The design will have many features and will change throughout the design proposal. A preliminary budget is a large number because of the remediating process before the design is completed.



The Appendix

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An important part to the thesis and study is understanding the native pollinator species of the Los Angeles, California area. In order to successfully create a pollinator paradise, the pollinators have to be put first. Along with the bees as the main users, the visitors also need to be educated on the pollinators. Many people fear bees and try to stay away. Most do not understand that native bees do not sting or will only sting if they feel threatened.

The idea of people opening up to the idea that bees are not the enemy will take time but can be accomplished with the proper education. Providing an educational experience will help people understand the need for bees and that their decline could mean the end to the human species. This is not stressed enough and most take bees for granted. By understanding what people think of when they hear the word bee will help me incorporate the ways of eliminating these words. When people create positive experiences with the bees and pollinators they can implement the same planting scheme within their own back yard and provide for the harmless threatened species, the bee.





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“Your smile is your logo, your personality is your business card, how you leave others feeling after an experience with you becomes your trademark.”

- Jay Danzie

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PREVIOUS STUDIO EXPERIENCE

2nd Year

Fall Studio: LA 271 Intro to Landscape Arch Studio

Projects:

Teahouse Project, River Oaks Park, Moorhead, Minnesota
Cooper Community Garden, Downtown, Fargo, ND

Spring Studio: LA 272 Parks and Open Spaces Studio

Projects:

Monument Park, Agincourt, Iowa, an imaginary city
Michelson Park Design, Michelson Park, Fargo, ND

3rd Year

Fall Studio: LA 371 Site Planning and Design Studio

Projects:

Library Park, Lot Next to Paradiso, West Fargo, ND
Peace Park, Civic Center, Fargo, ND

Spring Studio: LA 372 Community Plan and Design Studio

Projects:

Community Garden, Chicago, IL
Friluftsliv, Center, ND
Agency Village, Reservation near Sisseton, SD

4th Year

Fall Studio: LA 471 Urban Design Studio

Projects:

Mission Bay Neighborhood, San Francisco, CA
Tanner Springs Park Model, Portland, OR

Spring Studio: LA 472 Remediation and Planting Design Studio

Projects:

Mid-America Steel Project, Fargo, ND
The Window to Warroad, Fargo, ND

5th Year

Fall Studio: LA 571 Environmental Planning Studio

Projects:

The Port of Bismarck, Bismarck, ND