REVEALING THE FORGOTTEN

San Joaquin River
Interpretive Center

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San Joaquin River Interpretive Center

PHILIP DINH **JUNE 14, 2013** **SENIOR THESIS**

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Abstract

Over generations of cultural practices and development of the landscape, natural systems have changed from their original states to ones that are greatly influenced and impacted by human interactions and growth. Being one of the main water bodies located in the central valley, the San Joaquin River is a prime example of how these processes can have negative effects, turning a landscape once rich in biodiversity to one that is in need of conservation and restoration. This project addresses the historical and current practices that are affecting this natural landscape on multiple scales. The first scale looks at the river on a regional extent, as a complex system that serves as a prime resource in a variety of aspects, from providing habitat for a range of wildlife to a common resource for the people. The second scale looks at the contextual elements surrounding the specific site. At this range, we are able to understand how these external components influence our site, and how it affects the future design. On a closer scale is the specific site located at the Coke Hallowell Center for River Studies. At this scale, I analyzed the adjacent properties and context to see how that landscape may affect the overall design. The goal of this project is to propose a design which will engage site visitors through a variety of interpretive exhibits and historic forms. These displays will create an experience in which visitors will be eager and curious to learn more about the history and ongoing issues involving the site. Its main objective is to educate site visitors in the natural and cultural history of the river through interactions with the landscape.

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INTRODUCTION 01

Importance of **Rivers**

Rivers are complex systems that provide a range of benefits to the environment and the organisms that it supports. They can be seen as a reflection of history, of the continent, the people and the organisms (Wohl, 2004). Any changes occurring in the surrounding landscapes are reflected in the rivers response to the situation. They are a resource that provides us with the water needed for daily activities such as for drinking or agriculture, but also serves as transportation corridors, power generators, and provides recreational opportunities. These landscapes have been highly altered due to human interaction and demand for water as a resource.

The growth of human population and expansion of urban landscapes result in a high demand of this natural resource. The resource will become depleted if humans continue to use it unsustainably. According to the Brundtland Commission, sustainability is defined as "Development that meets the need of the present without compromising the ability of future generations to meet their own needs (The World Bank Group,

Fig. 1.1 - Meandering River - The Amazon located in South America depict the complexity of a river system

Fig. 1.2 - River Rouge Dearborn - High demand for water resources result in more channelization of the system

2001)." This overuse not only depletes the resource, but also changes the properties of these rivers, such as the river's flow, its function, and ability to provide habitat for fish and animal species. The common misconception is that rivers should be clean and organized, but the natural river actually provides quality habitat and supports a variety of organisms within the channel and floodplain.

Rivers play an important role on the function of an ecosystem, serving as a habitat for aquatic species, but also by promoting the growth of riparian habitats adjacent to the rivers. By changing the natural system of the river, we are also affecting the organisms that rely on it to survive. This is why it is important to conserve these special landscapes, as they play an important role in how our ecosystems function.

"Water is a universal solvent that is used at some stage in the manufacture of every product we consume." (Wohl, 2004)

Dams

The numerous uses of a structure such as a dam makes its functionality a complex system. In many cases, these structures are constructed for reasons such as: controlling water supply, flood control, to create reservoirs for irrigation, sediment control, and hydropower generation (International Commission on Large Dams, n.d.). According to the World Register of Dams of the use of single purpose dams, "50% are for irrigation, 18% for hydropower(production of electricity), 12% for water supply, 10% for flood control, 5% for recreation, and less than 1% for navigation and fish farming" (International Commission on Large Dams, n.d.). The purpose of Friant dam eventually led to the diversion of 95% of its water to the productive agricultural landscapes. This process resulted in a degraded landscape, such that a 60 mile stretch of the river runs dry during most times of the year, leading to the decline in wildlife habitat (United States Environmental Protection Agency, 2013). On the other hand, many farmers argue that this structure helped generate one of the most

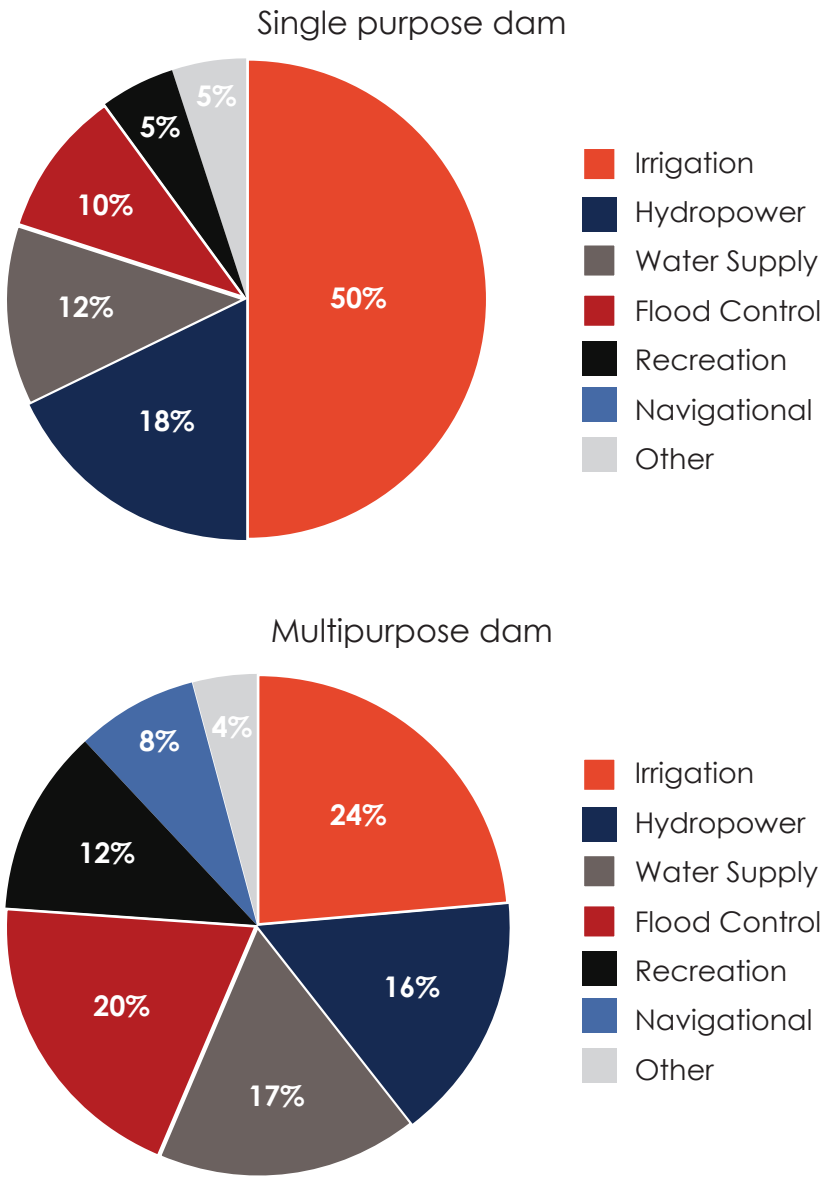


Fig. 1.3 - Chart displays the use of water that is diverted from dams.

productive agricultural landscapes in the world.

Impact of Ecology – Although there are many beneficial purposes of a dam, it also carries some negative aspects to it as well. The natural existence of an ecosystem is disrupted with the introduction of a dam. Natural water flow is altered, and the physical properties of the resources disturbed. Problems like erosion, sedimentation, and temperature change are all results of a dam. These changes alter the complex structure of the food web; if an insect at the bottom of the chain is affected, so are the large predators at the top.

These aquatic landscapes often serve as habitat for many fish species such as salmon. These fish use these waterways not only as a migration channel, but also as a habitat for spawning. When their habitat becomes disrupted with altered water levels and the addition or removal of gravel and sediments collected at the bottom of the streams, it becomes difficult for them to find adequate spawning areas to reproduce. In addition, the tall infrastructure of a dam does not allow the fish to migrate up the river, causing their population to decline (Wohl, 2004).

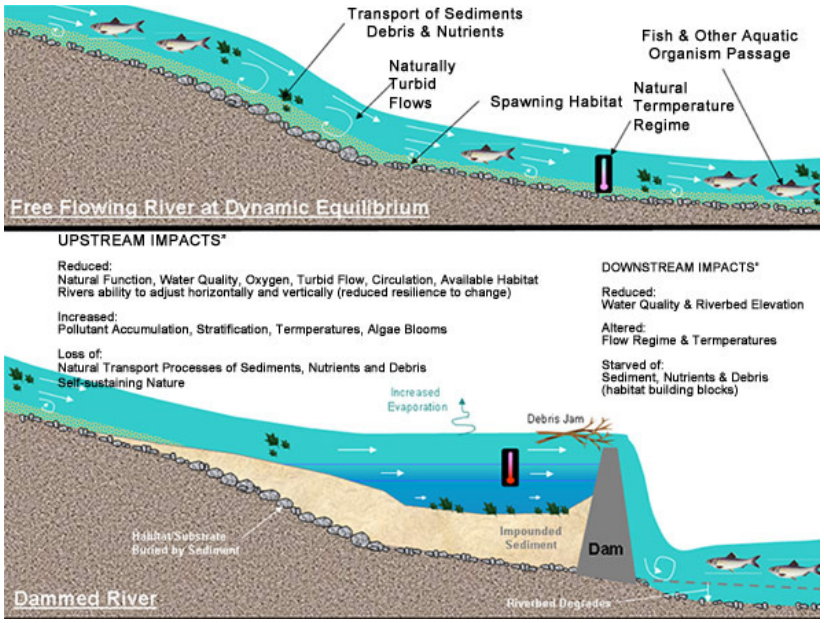


Fig. 1.4 - Effects of a Dam on Free Flowing Water

Fig. 1.5 - Roman Cornalvo Dam

The Issue

The San Joaquin River is a historical waterway that was once thriving and inhabited with a variety of wildlife species. Native settlers would seek habitation along the river, as it contained an abundant amount of resources needed for their survival. "Settlements and towns have emerged and thrived near rivers and streams because of the water they contain, the transportation they provide, and the life that they support" (Wampler, 2012). The combination of the hydrology and the riparian vegetation that lines the edge of the San Joaquin River provide an environment that was able to support and sustain the adjacent communities.

The river does not function as it has historically, formerly an iconic landscape that merged cultural and natural activities. It essentially was an ecologically diverse ecosystem that thrived on its own. Sadly, much of the natural environments that depict the central valley's natural landscapes has been impacted and seen changes to its form. Studies have shown that the San Joaquin Valley has seen a loss of 95

Fig. 1.6 - The San Joaquin River used to have one of the largest Chinook Salmon runs.

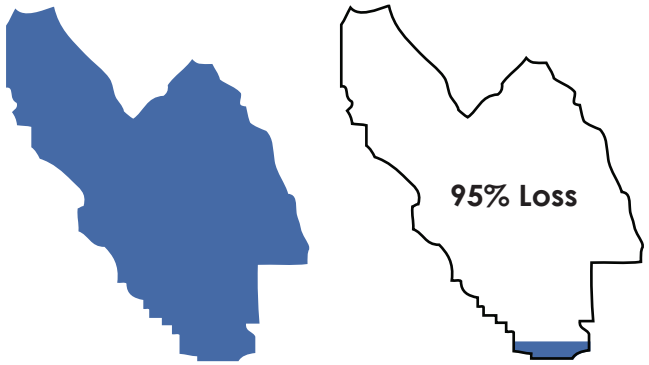


Fig 1.7 - Percent loss of wetlands
Left: Historic wetlands
Right: Current amount of wetlands have decreased 95%

percent of their wetlands (The Nature Conservancy, 2013). Through development and other human activities, the river has declined to become one of the most polluted rivers in the world. The introduction of Friant Dam has led to the diversion of water to agricultural fields. Water flow through the river in some parts are nonexistent, portions are filled with litter and there is an accumulation of hazardous chemicals and pollutants through influxes of agricultural and urban runoff.

In addition to the impacted flow of the river due to the demand for agriculture, there is also development, industrial and recreational activities that occurs along the river. There has been a conflict between the amount of natural space that is preserved and the urban spaces that are being built. Contemporary urban sprawl and the historic processes of mining have played large roles in the decline of the natural function of the river and the decline of the surrounding habitat. Water levels have fluctuated and riparian habitat is slowly disappearing as cities continue to grow. If these practices continue at the current rate, water channels and valuable habitat may become non-existent.

The combination of different biotic and abiotic factors have influenced the form and function of the San Joaquin River as a natural resource. These elements have led to the degradation of the system, altering the natural processes that work together to form an ecosystem. The current issue in the process of restoring or conserving these landscapes is the lack of awareness of the subject. This project will help inform others of the activities associated with the river and its surrounding landscapes to give a better understanding of how such an important and complex system can be degraded over time.

Fig. 1.8 - San Joaquin Riverbed Dry

Project Goals

1. To design an interpretive center which entails a variety of interactive exhibits

2. To envision the site on multiple scales: A regional scale, contextual scale, and a site scale

3. To educate site visitors of the natural and cultural history of the central valley

4. To inform about the current condition of the San Joaquin River, and current conservation and restoration practices

5. To use restoration techniques to not only return the landscape to its natural form, but to concurrently reveal the layers of the sites past

BACKGROUND 03

Riparian Areas

The National Research Council describes how riparian landscapes have been influenced by many different factors from urban expansion to human interaction. These factors have degraded the natural ecosystem within these riparian areas, and altered the way that these systems function. There are many different variations in definition of the word "riparian."

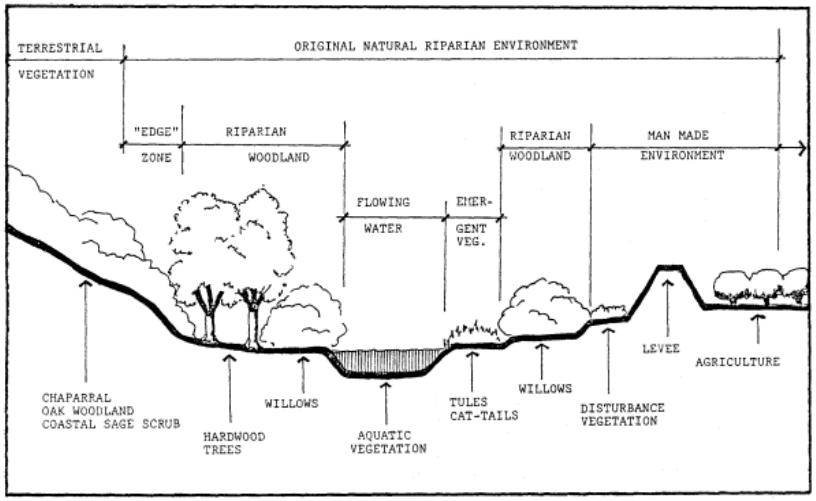
> "Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. Riparian areas are adjacent to perennial, intermittent, and ephemeral streams, lakes, and estuarine-marine shorelines." (National Research Council, 2002).

Humans have altered the conditions of riparian areas over centuries, and it is known as "urbanization" (National Research Council,2002). These changes are not only aesthetic, but also physical, changing the functionality of these areas. For example, in a natural landscape, water tends to be absorbed by plants, and infiltrated into the ground. This natural process helps regulate water level as it forms on the surface. Urbanizing an area entails the implementation of hardscapes or other surfaces that do not have the same permeable qualities as the natural vegetation. With this comes a variety of issues, from increased total runoff from hard surfaces, to earlier and higher peak discharge. These issues also affect the streams and rivers, as their flow rates also increase. Erosion and habitat degradation are indirect results of urbanization, leading to a decrease

Fig. 2.0 - Shows a dense riparian corridor.

in wildlife habitat. Water quality seems to be proportional to urbanization; as impervious surfaces increase, water quality tends to decrease. These issues are varied depending on the situation and landscapes.

Recreational activities also play an important role on how a riparian systems functions. "Negative effects on riparian areas from recreational activities and facilities stem in part from lack of environmental assessment before plans are implemented, a dearth of sound ecological design to mitigate impacts, and absence of ongoing monitoring to detect problems."



Fi. 2.1 - Shows the relationship between the different riparian vegetation along a river.

(National Research Counsil,2002). Providing a leisure area for people to enjoy does not affect the riparian areas, it's the placement of these sites that might have an impact on the ecosystems. With recreation comes pollution, from water pollution to sound pollution which all affects the natural landscape in some form. Riparian corridors are a vital component to the health of the ecosystem. They provide the structural stability for these channels, and are effective in promoting greater biodiversity.

Landscape Restoration

According to the Landscape Restoration Handbook by Donald Harker et al., part of a restoration project is to bring back a sense of naturalness, "The degree to which the present community of plants and animals resembles the community that existed before human intervention" (Harker et al, 1999). When comparing an urban environment to a natural landscape, most people will look at textures or shapes. Urban areas are tied (related) to hardscapes, or straight edges, whereas natural landscapes have soft textures of no given pattern. By restoring these landscapes to its natural forms, we help promote growth and knowledge of ecologically significant landscapes.

Landscape restoration is "an attempt to recreate nature," re-establishing the landscape to times that dated "presettlement, predisturbance, and/or natural conditions" (harker) . It helps return both the functional and structural properties to the landscape, recreating the landscape that once stood. By restoring the landscapes, it is also creating wildlife habitat. Landscape restoration has its benefits, from creating a healthier, more sustainable mosaic of land uses on the landscape, to regenerating the natural diversity of plants and animals which have adapted and thrived in the landscape. The natural systems are able to improve water quality, and also minimize erosion. It also creates a lower maintenance landscape, reducing our dependency on water and the production and use of chemicals. It helps protect ecosystems and ecological communities from the impacts of urban development. The process of restoring a landscape is more challenging then destroying one which was developed over millions of years.

Restoration was define by the National Research Council (NRC) as the, "return of an ecosystem to a close approximation of its condition prior to disturbance" (EPA, 2013). Restoration projects need to be viewed at a larger regional scale. "Merely recreating a form without the functions, or the functions in an artificial configuration bearing little resemblance to a natural form, does not constitute restoration." The different elements tied into the restoration project need to be able to collaborate to form a cohesive landscape. If the different elements that are implemented into the restoration project do not sync together, then the landscape will not be able to sustain itself, which is the main goal. Natural landscapes have the ability to be self sufficient. The goal is to reconstruct the landscape through manipulation, and the reintroduction of native animals and plants.

The Watershed Ecology Team of the Office of Wetlands, Oceans and Watersheds developed a list of Restoration Guiding Principles. These guidelines help direct a restoration project even after its completion. The goal is to restore it to as natural a landscape as it could be. This includes restoring native plants, using passive restoration, and developing a system that will be self sustaining. Restoration projects should not always create a landscape that is beautiful and clean. It may involve making an area messy, or leaving debris from trees in streams, which in turn will create habitat for wildlife in natural settings. This guide is a useful tool to help lead people in the right direction when it comes to restoration projects.

MVVA

CT WATER TREATMENT FACILITY

New Haven, CT (2001–2005)

Dallas, TX

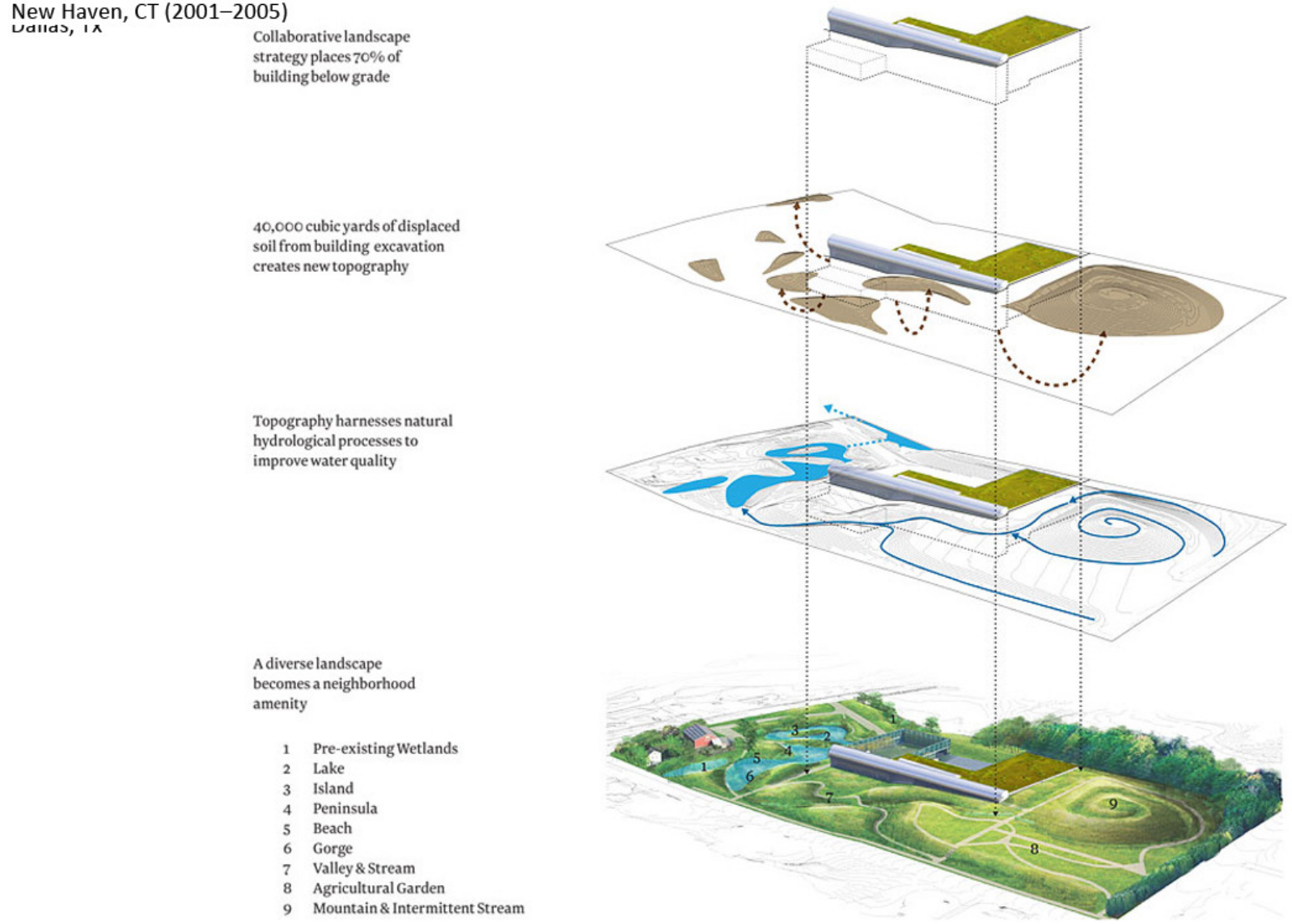


Fig. 2.2 - This graphic shows how a displaced landscape can become a restored and diverse environment.

Urban Ecology

Question- How do you create a balance between the natural and built landscapes, and where does one draw the line between excess developments in ecologically prominent area?.

What is urban ecology? The term urban ecology has carried many different meanings, some focusing more on the urban environment whereas others focus on the ecological aspects, and sometimes how social impacts influence these features. It became important under the discipline of ecology, because humans were altering the landscape resulting in the degradation of the non urban settings. Although the term "Urban Ecology" has been known since the 1970s, different disciplines have altered its meaning to fit their studies. Ecologist Mark J. McDonnell proposes his definition of urban ecology as, "Urban ecology integrates both basic (i.e. fundamental) and applied (i.e. problem oriented), natural and social science research to explore and elucidate the multiple dimensions of urban ecosystems" (McDonnell, 2011). It focuses on the relationships that these different dimensions relate to one another, especially the balance between an urban setting, and a natural setting.

Just to show a variation in the definition, The Society of Urban Ecologist (SURE) defines urban ecology as:

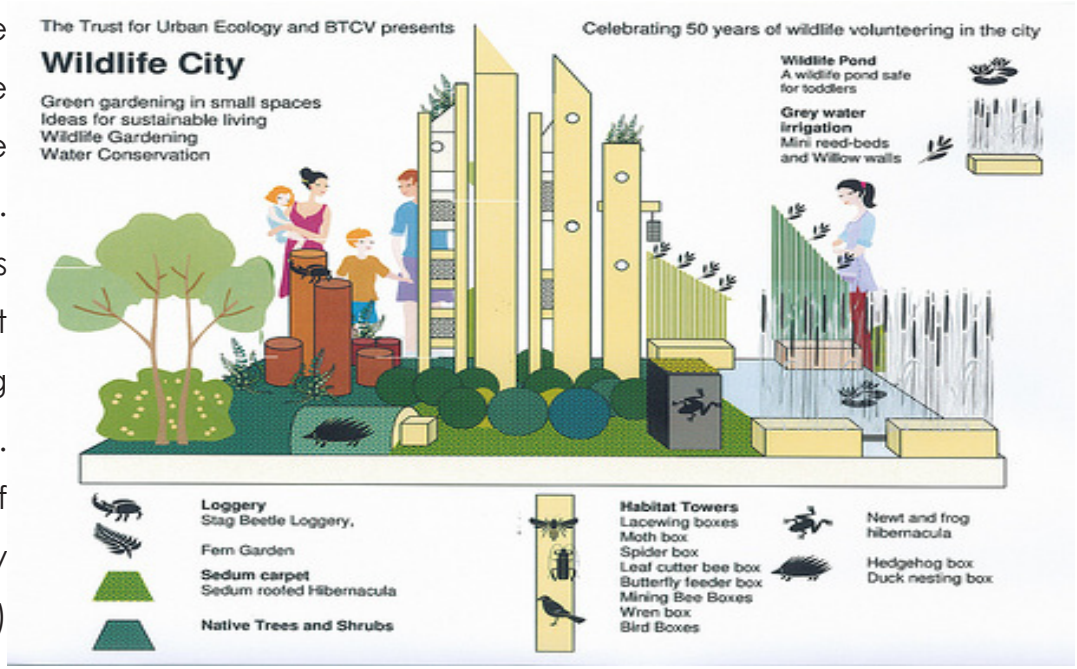


Fig. 2.3 - Shows the interaction between the urban and natural environments.

The study of structure, dynamics and functions of urban ecosystems including ecosystem assessments, urban ecosystem management and design in all kinds of cities and towns. It is concerned with the use and development as well as conservation and enhancement of the urban ecosystems and its associated values for the benefit of current and future generations. (Society, 2013)

The term Urban Ecology has evolved over time, and continues to be redefined in current disciplines. According to McDonnell, "Over the last 30 years, the discipline has grown and now possesses a unique assortment of approaches, frameworks, study locations, and methodologies that delineate urban ecology from other disciplines." (McDonnell, 2011) Although there is an overlap in study with Ecology, or Urban Planning, Urban Ecology strives to interweave the multiple disciplines, looking at them as a whole, and not separate entities. The two forms of landscapes, urban and natural correlate with one another, as urban spaces increase, natural landscapes decrease. As landscapes are modified for urban spaces, natural habitats are becoming degraded and sometimes non-existent.

Fig. 2.4 - These two images of Central Park in New York City show the relationship between urban and natural space.

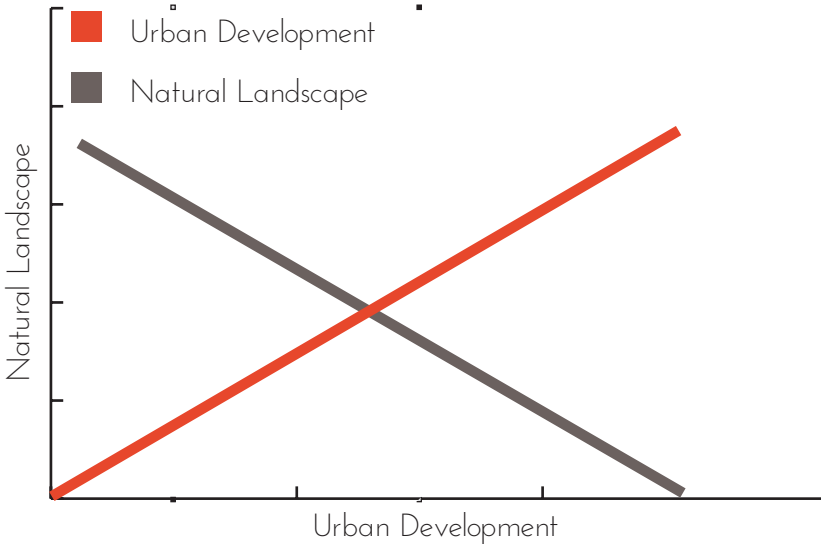


Fig. 2.5 - This graph shows how Urban Development negatively correlates with the loss of Natural landscapes

Sand & Gravel Mining

In order for infrastructure to be built, we need to acquire the resources needed such as sand and gravel. These resources are located along streams and rivers, as erosion of rocks are carried down these corridors and deposited along its banks. The process of gravel and sand mining require site specific information such as topography, hydrology and hydraulic information before the mining process can move forward. The processes modify the physical aspects of the land surrounding aquatic landscapes, but are a process that is in high demand. Calculations determine the amount of product that can be excavated before negatively altering the landscape. Excessive and poor mining practices often lead to the degradation of these landscapes, from the structural stability of the channels, to the destruction of riparian habitat adjacent to the site.

The impacts of mining can be organized into three separate categories: Physical, Water Quality, and Ecological. Sand and gravel mining leaves remnants of its industrial processes in the form of pits dug into

Fig. 2.6 - Shows the proximity of the mines to a river corridor.

Fig. 2.7 - The industrial infrastructure for mining

the ground. In many cases, these pits are abandoned and become an eyesore in the landscape. In other occasions, they are reclaimed and restored, serving as potential animal habitat or recreational element (Collins, 1995).

In terms of water, the quality at these locations are not the best due to the sedimentation and pollution from heavy machinery used in the process of mining. The erosion also caused sediments to suspend in the water, which affects the ecosystem, and the water quality downstream. These factors also play a role in quality of riparian habitat and wildlife populations. Similar to a food chain, each process is interlinked, and has an effect on another process. For example, the process of mining may degrade stream habitat through erosion. With the loss of these stream banks, species that rely on these stream banks as shelter are left with no protection. These habitat disruptions lead to the decrease in biological diversity. Disturbances caused by mining has an effect on the ecological aspect of the site, and potentially the loss of habitat overall (Collins, 1995).

Fig. 2.8 - Quarry Garden in Shanghai Botanical Garden - This image shows how a quarry, a former abandoned mining and gravel site, can be restored to serve as a destination for tourist while showing the cultural history of the landscape.

Interpretive Center

The California Department of Parks and Recreation adopted a style of learning within their parks, known as interpretation. This term is defined as "a special form of communication that helps people understand, appreciate, and emotionally connect with the rich natural and cultural heritage preserved in parks" (CDPR, 2013). It is important to create an experience that will leave park visitors wanting to learn more, or being more curious about the elements.

Each individual has their unique way of learning and retaining information. The goal of an interpretative center is to communicate their ideas through a variety of techniques, whether it is through passive learning, or active learning. It is there goal to convey the importance of the site in general, but also why it should be important to you.

The design of an interpretive center has a lot of considerations, for example, "Why would a visitor want to know this (information or topic that the exhibit is presenting)?" and "How do you want the visitor to use the information the exhibit is presenting?" (Veverka, 2013). These questions help influence the design of the center of how to not only attract visitors, but to maintain their interest and help engage them with the exhibit.

Fig 2.9 - Lowell Oregon- Interpretive signage displayed for site visitors.

04 Case Studies

Center for Land Based Learning

The center for Land Based Learning is an organization which helps develop leadership skills in youth through the interaction with the natural environment. Participants are able to learn about sustainable agricultural practices, the environment, and how these systems coexist with each other. They offer programs that focus on different topics: SLEWS for restoration, Farms Leadership Program for farming and agriculture and Green Corp which is a job skills training stewardship.

The program that addresses similar issues to my particular project is SLEWS – Student and Landowner Education and Watershed Stewardship. SLEWS was established to help revive and restore landscapes to its natural form. Over the past two decades, these natural landscapes have become degraded by bad agricultural practices and the development of urban spaces. "The loss of native plants, coupled with intense grazing, has contributed to large-scale erosion, degradation of water quality, and loss of wildlife habitat" (Center for Land Based Learning

Fig. 3.0 - Center For Land Based learning

2011).

The program has made a large impact on not only the students who participate, but also the landscape that is restored. As part of the program, participants strive to enhance the biological diversity of the landscape while creating a connection with the landscape itself. They do this through the re-vegetation of native plants to create wildlife habitat, which in turn improves the water quality. SLEWS give students the opportunity to learn about ecological restoration and conservation in a setting that enhances their overall experience. The ability to see the results from their hard work helps students get a sense of accomplishment, knowing that they have made an impact on the future of the landscape. SLEWS not only restores landscapes, but also educates students through hands on experiences.

Fig. 3.1 SLEWS

Fig. 3.2 - Farms Leadership Program

Fig. 3.3 - Green Corps v

Union Point Park Oakland, CA

As time goes by, post industrial sites become abandoned, and its remnants left for future developers or landowners to take care of. These structures or artifacts are usually run down and contains contaminants. They are often removed from the site when new development begins. With the elimination of these structures also goes the industrial history of the site. The past use of the place becomes forgotten with new infrastructure built on top, hiding the layers of the history.

Union Point Park is an example of a brownfield landscape that was developed into a public park. The U.S. Environmental Protection Agency defines brownfield properties as, "Real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant" (U.S.EPA, 2013). Previously, the site held multiple uses, from canary, lumber yard and metal recycling scrap yard. The soil on site was contaminated with toxic chemicals which made developing the site a

Fig 3.4 - Industrial area adjacent to Union Point Park

Fig 3.5 - Park Aerial image

challenge (CCLC, 2013).

In most cases, former industrial brownfields with contaminated soils would be avoided by developers because the removal of the toxic chemicals would be too costly. Although that issue was present, Landscape Architect Mario Schjetnan saw this as an opportunity to retain the materials on site, and reuse the resources he could. By implementing a more cost effective design strategy that remediated the soil on site, Mario was able to save money in which funded remaining project. When working with a site that has such an impact on the landscape itself, it is important to work with the issues, and be able to use those issues as part of the design concept.

The history of the site should not be forgotten, but merged with the new design so that users can know about the historical impact it had on the site. By retaining the infrastructure, materials and other elements on site, we are not only developing a space that showcases the new elements on site, but maintain the industrial history of the landscape, tying it back into the design.

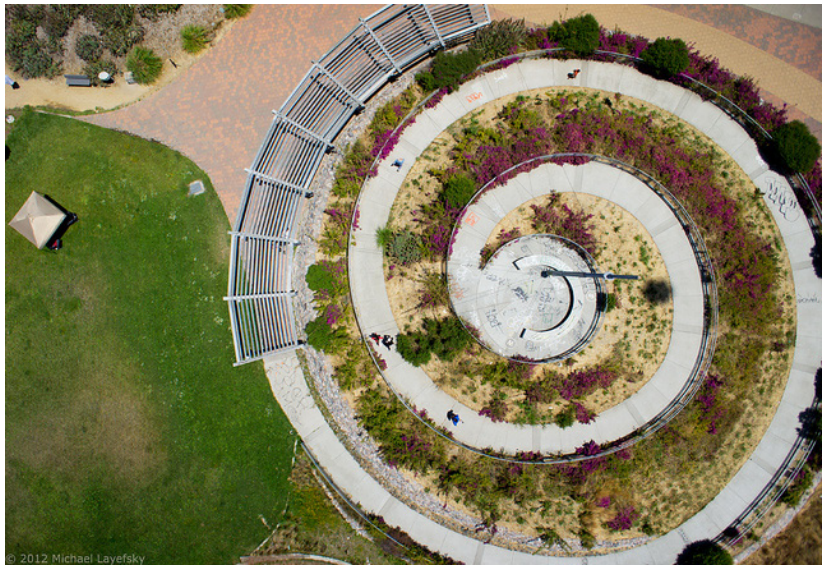


Fig. 3.6 - Sprial mound contains soil remediation practices.

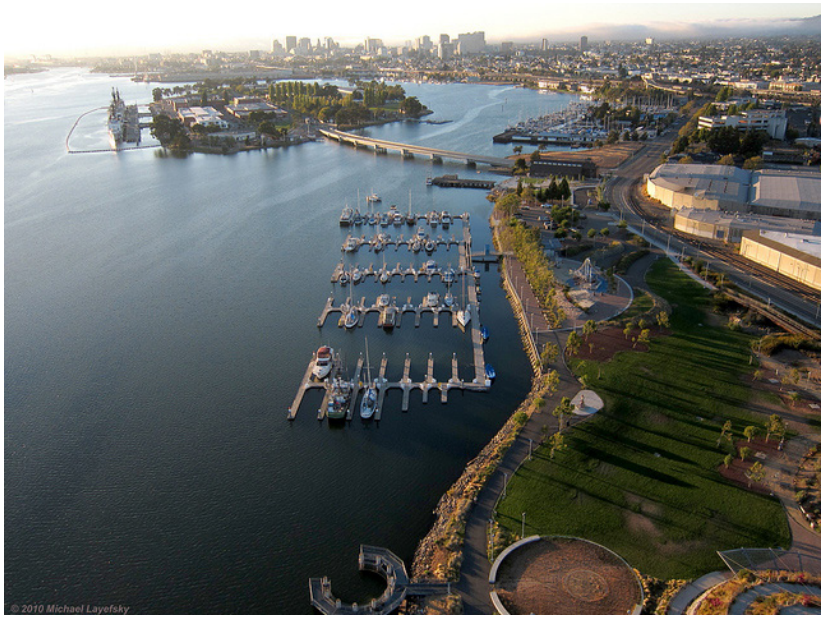


Fig. 3.7 - Aerial view towards the waterfront

Yolo Demonstration Wetland Davis, CA

The Yolo Bypass Wildlife Area of Yolo County is a 16,000 acre Wildlife region that contains one of the largest wetlands in the United States (Yolo Basin Foundation, 2013). The bypass serves multiple functions such as: flood control, wildlife and habitat management and recreation and educational uses. Being such a large site, it is hard for visitors to capture all the beauties and learn about the site itself. This is where the demonstration pond plays an important role.

The Yolo Demonstration Pond serves as a multifunctional space, a wetland habitat for wildlife and an outdoor educational space. Located at one of the Department of Fish and Games offices, the facility includes many different elements that create a space I see as an "outdoor classroom." When entering upon the site, a visitors center helps guide people towards the ponds and its adjacent counterparts. A strategically placed trail system navigates alongside the demonstration pond, with signage that informs you of the different vegetation and animals found in the wildlife area. Outdoor

Fig 3.8 - Shows the Yolo Bypass Wildlife Area

seating allows for gatherings or lectures, and overhead structures allow viewers to look at nature while being shaded.

The idea of bringing the class environment to a unique space outdoors motivates students to want to work more. The way one retains information vary depending on the person. Different methods of learning include: auditory learners who like to listen, visual learners who like to see, and kinesthetic learners who process information through a "hands on" approach. The ideal center would tailor to each of these learning abilities to attract a wider range of visitors (Yolo Basin Foundation, 2013).

Fig 3.9 - Logo for the Yolo Basin Foundation

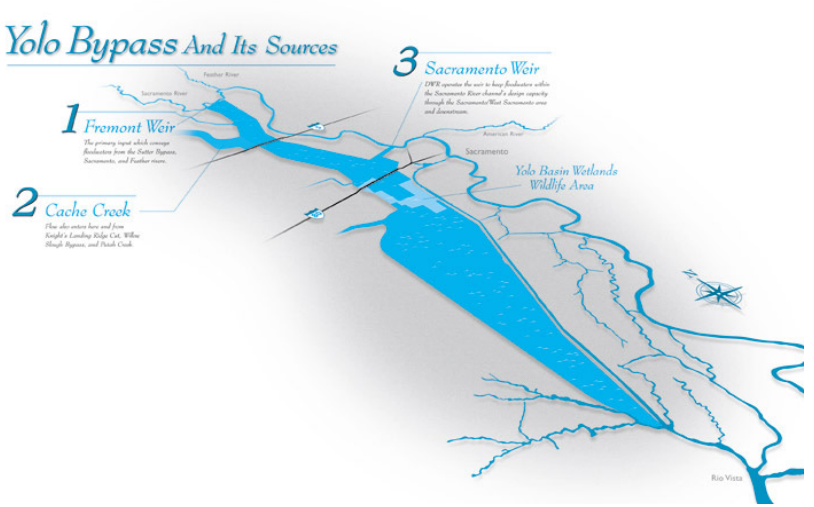


Fig 3.10 - Yolo Bypass and its sources

"The wounds we have inflicted on the Earth can be healed ... But if it is to be done, it must be done now. Otherwise, it may never be done at all."
Jonathon Porritt - 'Save The Earth'

Site Analysis

Regional Scale

The San Joaquin River is the second largest river in California. It meanders through the central valley, home to one of the most productive agricultural regions in the world. In the region of our specific site, the river acts as a divider between two developing counties, Fresno County and Madera County. Our site sits adjacent to the river's edge in Fresno County. The cities of Fresno and Madera are urban spaces surrounded by agricultural practices. With the site for the design being secluded from any large population it is the residence in these two cities who are the main communities to try to reach out to and attract.

Fig. 4.0 - San Joaquin River Map

Fig. 4.1 - Regional Scale Map

Contextual Scale

The importance of surrounding landscapes and land uses in relationship to a site influences the design strategy or goals that one takes to approach their project. At a contextual scale, the area has held multiple purposes, each purpose playing its role in creating the identity of the central valley. The adjacent landscapes besides the river corridor contain: agricultural fields that help generate produce for food, active and reclaimed mining sites which provided a materialistic resource that is used for development practices, and expanding housing developments that are growing with the increase human population.

Site opportunities- The landscapes that help identify the context of the site offers many opportunities. The conservancy has the opportunity to acquire the current mining site and incorporate them into a restoration plan when mining is completed. This can be an expansion of the river center to tie in with the overall master plan of the river. Trail systems can bring visitors from the river center to the actual river corridor. This can serve as educational and recreational opportunities for the people.

Site constraints- Being a highly modified landscape, there are limitations on the design of the area. A large concern at this scale is accessibility to the site, and accessibility to the river. The main road that leads to the river center does not encompass a welcoming entrance. When at the river conservancy,

Context Map

there is no access to the river due to the mining. All of these setbacks can also be seen as a chance to design something that will draw more interest into the space.

As a future design strategy, a phasing plan would be beneficial to show the acquirement of the adjacent land. This will help show the connection from the site to the river, and how the site design would tie into the design or portion of the river's Masterplan.

- **Agricultural Land**
- **Riparian Corridor**
- **Existing Mining Site**
- **Urban Development**
- **San Joaquin River Conservancy**
- **Roads**
- **Opportunities**

Figure 4.2 - Contextual Map showing the different land uses.

Site Scale

Site Inventory: The existing infrastructure and design elements on site are all part of an overall idea of developing this interpretive center. Elements on site include conference and events center, trail systems, tool shed, museum, visitor center and a demonstration pond.

1. Visitors Center - The visitors center is the starting point to ones journey here at the river center. The center provides visitors with a variety of informative brochures about events on site, programs, and also current restoration projects. They also comprise of a gift shop for souvenirs. It is the primary welcome station, a node where visitors converge before breaking away on their own exploration.

2. Tool Shed - The tool shed is located straight ahead of the main driveway that leads to the parking lot. It contains the necessary tools and equipment used on site for maintenance and repairs.

3. Existing Trail System - The existing trail system creates a path that leads off site to the San Joaquin River. The trail is currently inaccessible due to mining activities happening adjacent to the site.

4. Reclaimed Mining Site - Mining pits are located along many parts of the river. This pond was a former mining pit, but has been reclaimed and restored. These sites can potentially become wildlife habitat or serve recreational opportunities.

5. Conference/Events Center - This building is the headquarters for the San Joaquin River Conservancy and Trust. The building mimics the style of a barn house on site, using repurposed wood and concrete. The interior consists of offices for employees and a conference center for meetings.

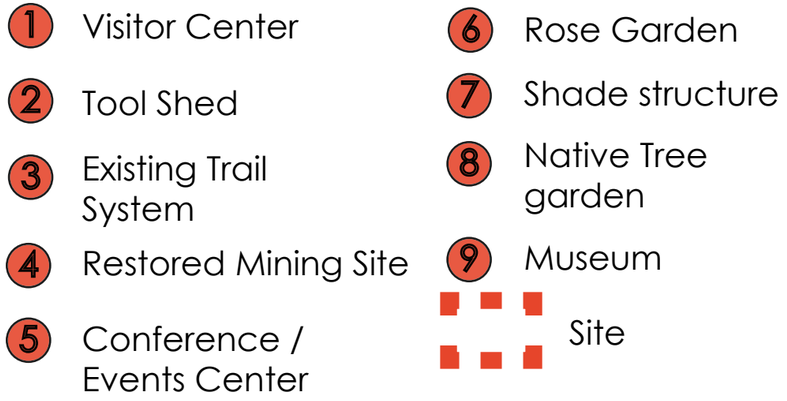
6. Rose garden - The rose gardens contain over 4 dozen varieties of roses.

7. Shade Structure - The existing shade structure provides coverage for small outdoor gatherings. Covered with vines and surrounded by flowers, this structure creates a sense of relaxation.

8. Tree garden- This tree garden contain a variety of trees, both native and non native. All species however are able to grow and thrive in the conditions of the central valley.

9. Museum - The museum, one of the main attractions on site is a restored ranch house. Here, visitors are able to learn about the history of not only the site, but also the San Joaquin River and central valley region.

All of these elements and infrastructure are what helps identify the center.



Site Inventory

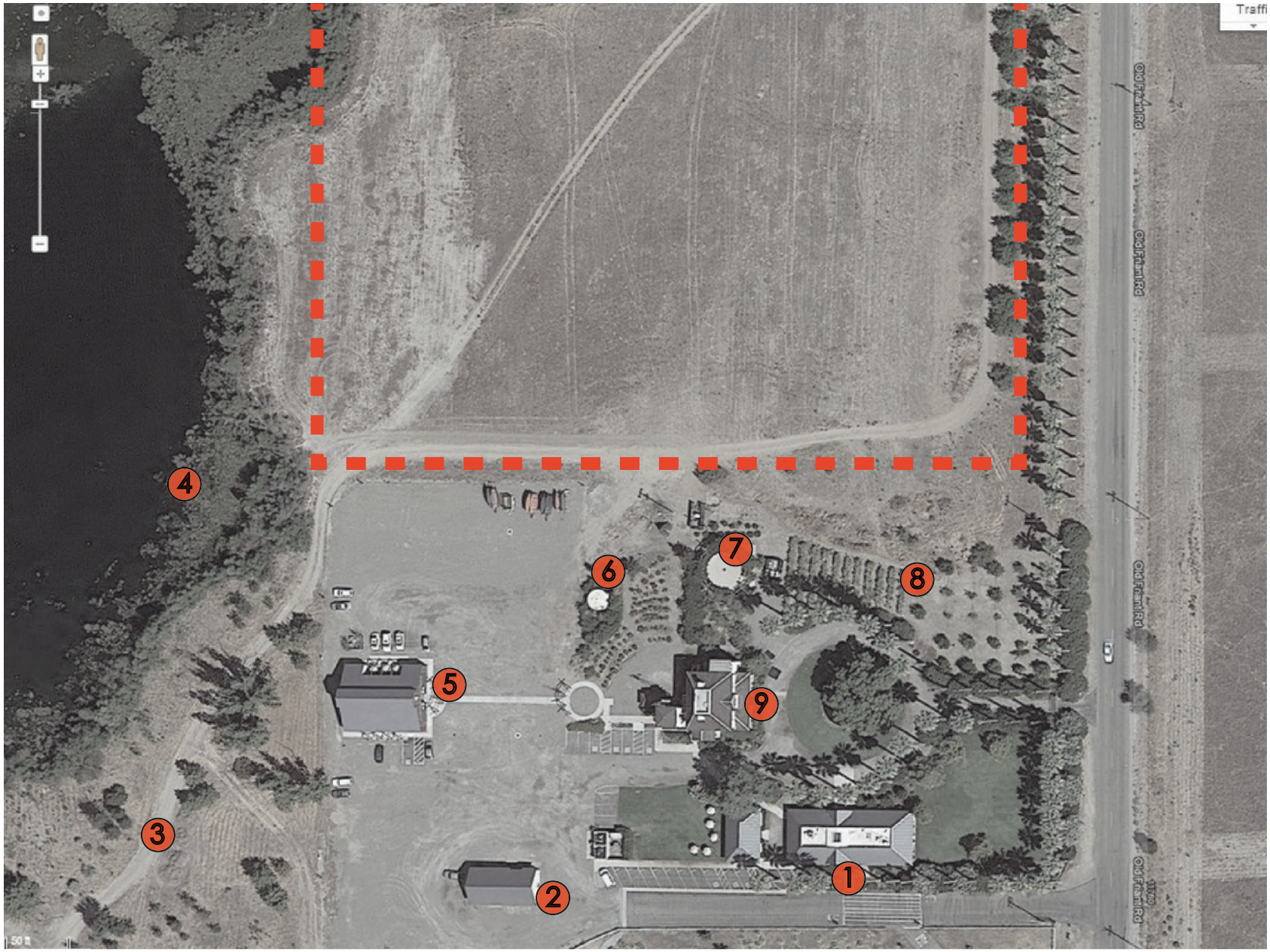


Fig. 4.3 - San Joaquin River Map

WILDLIFE POND

MUSEUM

EXISTING BARN

RECLAIMED AREA

SHADE/GATHERING AREA

THE DESIGN 05

Master Plan

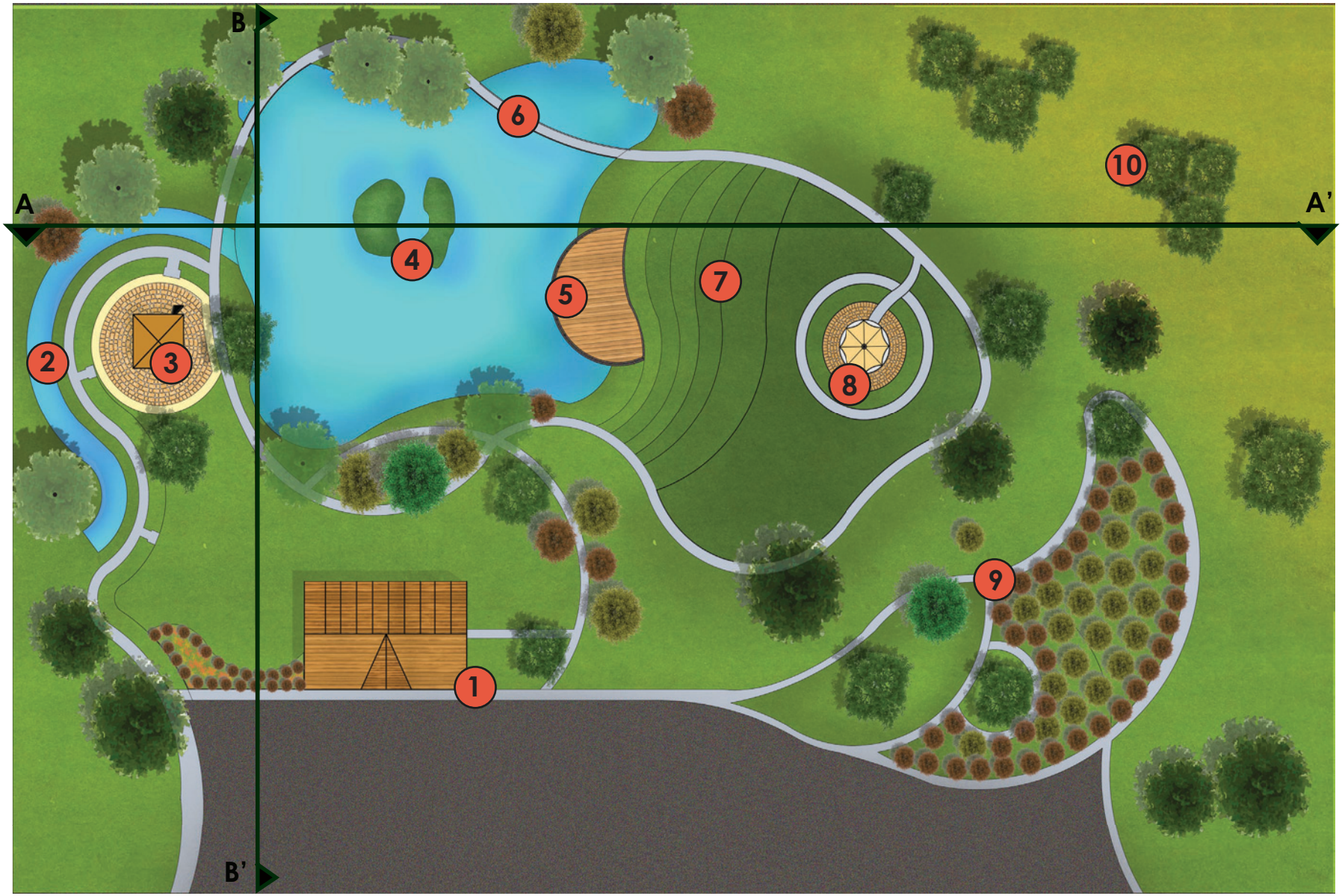


Fig. 5.0 - Masterplan shows the connection of the design elements on site.

With the amount of changes and alterations the natural landscape have encountered, it becomes important that we try to return them to their natural forms. This design aims to bring light to the many changes that have occurred within the central valley, in turn causing a negative affect on the San Joaquin River. In order to educate people, this plan provides a set of elements that will help develop the interpretive center for the San Joaquin River Center. These features will help enhance users experience within the site. They are not only extensions of some existing features, but include additional elements as well.

Fig. 5.2 - Water Channel

2. Water Channel – Along the western trail lies a channel that connects an existing pond off side to a proposed pond on site. Although water is not flowing in any of these areas, the channel may serve as an animal corridor from the existing pond to the proposed, increasing wildlife habitat.

Fig. 5.1 - Picnic Shelter

1. Picnic shelter – This structure imitates an existing barn structure located on site. With an exposed base, this this shelter is meant to serve as an outdoor gathering space and events area. Being located at the edge of the parking facility, accessibility is not an issue. On the northern edge of the picnic shelter is a more informal setting, drawing the visitors onto the lawn area towards the nature pond.

Fig. 5.3 - Viewing Platform

3. Viewing Platform – This viewing platform sits between two ponds, one created by mining and one that serves as a demonstration pond. This structure is an existing mining tower, and retains the industrial aspect to the site. The views created are an extension of the landscape, with the idea of being able to see the industrial past in the distance.

Fig.. 5.4 - Demonstration Pond

4. Demonstration Pond – The ponds goal is to show the results of restoring a mining pit. Although it is not an actual pit, it will still demonstrate the process. The soil excavated from this pit will be used to create the terraced amphitheatre to the east. The pond will display riparian habitat and wildlife. Practices similar to this may be implemented along degraded portions of the river to help restore the riparian corridor and promote wildlife habitat.

Fig. 5.5 - Viewing Dock

5. Deck – Spanning over the eastern edge of the pond is a wood deck. This deck allows visitors to view wildlife within the pond. With it being adjacent to the anphitheatre, the decj can also serve as a stage for outdoor gatherings and performances.

Fig. 5.6 - Moses Bridge

6. Bridge Below – Being one of the main attractions to the interpretive center, the bridge envelops a sense of enclosure while exposing visitors to a main element of the central valley, water. A blend between a bridge and a tunnel, the structure drops down below water. At this elevation, visitors seem closer to the water, and can potentially interact with it, enhancing their experience.

Fig. 5.7 - Ampitheatre

7. Amphitheatre - This amphitheatre is set up for visitors to have a view of the pond while they relax. Being built up with soil located on site, this design element not only reuses material, but relates it back to the terracing of the mining pits.

Fig. 5.8 - Shade Structure

8. Shade structure – This area located at the top of the terraces give a higher lookout towards the botanical garden and restored prairie. It is a duplicateof the existing shade structure adjacent to the vineyard.

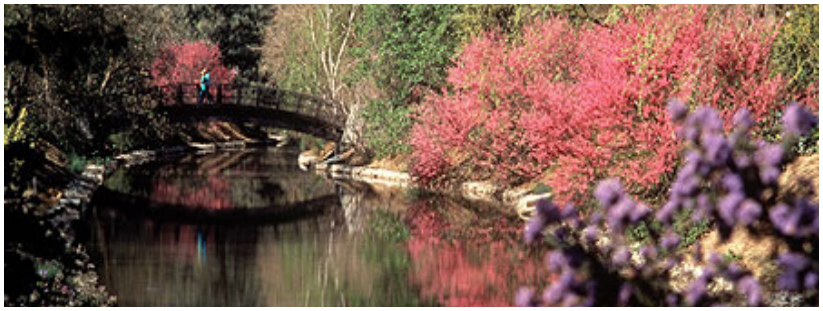


Fig. 5.9 - Botanical Garden

9. Botanical Garden- Located east of the picnic shelter along the proposed trail lies a botanical garden that displays native plants that thrive within the central valley. This area not only serves as a space of contemplation, but an area of education for its visitors.

Fig. 5..10 - Prairie

10. Native prairie – the northeast portion of the design contain a restored prairie, a landscape that has been in decline, but is native to California. The restored area attempts to bring back one of California's iconic landscapes for visitors to appreciate.

Fig. 5.11 - This perspective shows the view from the bridge towards the tower. This tower gives visitors the ability to see the landscape in a broader view. The idea is for the visitors to be able to see the industrial landscape in the distance, and the reclaimed/restored landscapes in the foreground.

Section A-A’

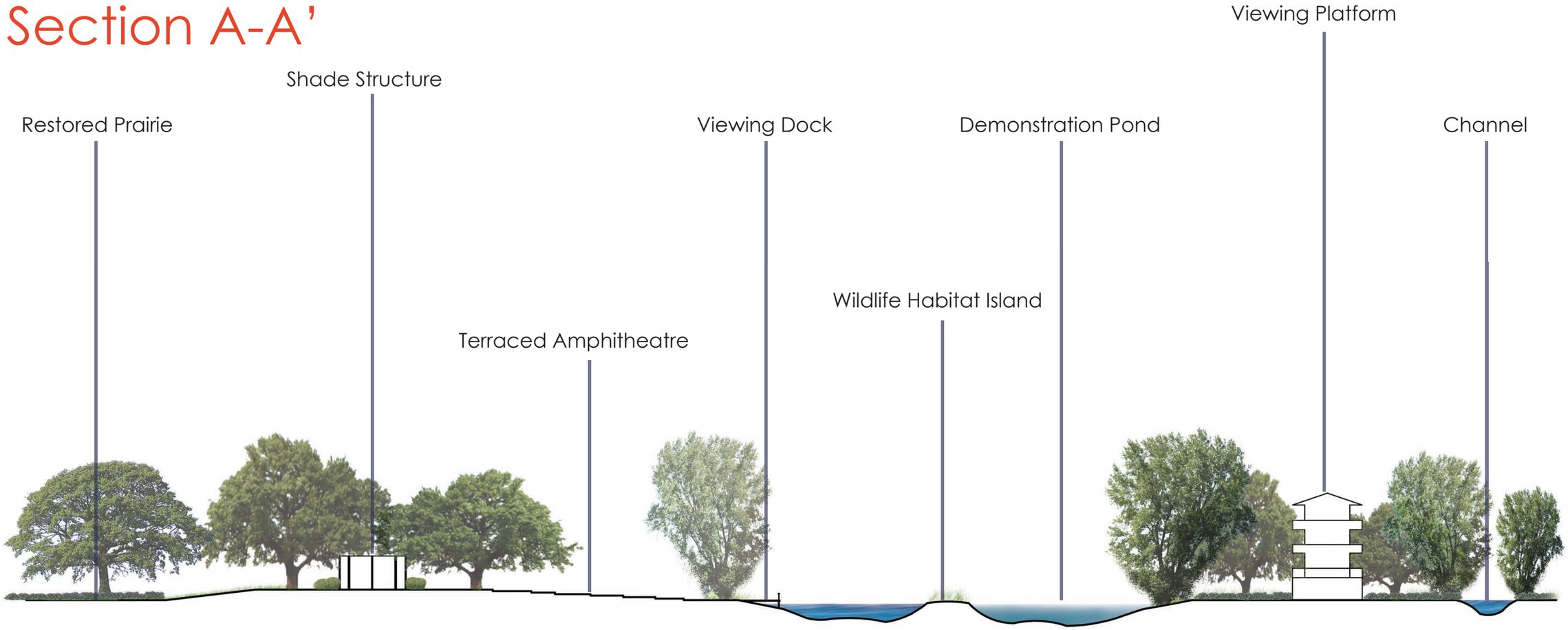


Fig. 5.12 - This section cuts horizontally on the site from east to west. It displays the vertical relationships between the different elements and how they work together.

California Native Plants

Chapparal current
Ribes malvaceum

Evergreen current
Ribes viburnifolium

California pipevine
Aristolochia californica

California fescue
Festuca californica

Island alumroot
Heuchera maxima

Deergrass
Muhlenbergia rigens

Western Redbut
Cercis occidentalis

Toyon
Heteromeles Arbutifolia

Giant Chain Fern
Woodwardia Fimbriata

Canyon Snow Pacific Iris
Iris “Canyon snow”

Hummingbird Sage
Salvia spathacea

Blue Grama Grass
Bouteloua gracilis

Fig. 5.13 - 5.24 - The planting palette located on the left display a variety of plants listed in The University of Californias Davis’s Arboretum’s All Star. Majority of the plants in this list are native to California. The importance is there ability to grow in the climate of the central valley being drought tolerant, and also providing habitat for insects and wildlife.

Fig 5.25 - 5.36 - The planting palette on the right displays a group of plants that are located along riparian areas. These plants are important because they grow near large water sources such as rivers/lakes/ponds. They are able to provide habitat for a variety of wildlife, and are essential in the richness and biodiversity of the river.

Riparian Plant Palette

Valley Oak
Quercus Lobabta

Blue Elderberry
Sambucus Mexicana

Coyota Brush
Baccharis pilularis

Oregon Ash
Fraxinus lactifilia

Western Sycamore
Platanus racemosa

Box Elder
Acer Negundo

California blackberry
Rubus ursinus

Cephalanatus occidentalis
Buttonbush

Fremont Cottonwood
Acer Negundo

Black Willow
Salix gooddingii

White Alder
Alnus rhombifolia

Red Willow
Salix laevigata

Section B-B'

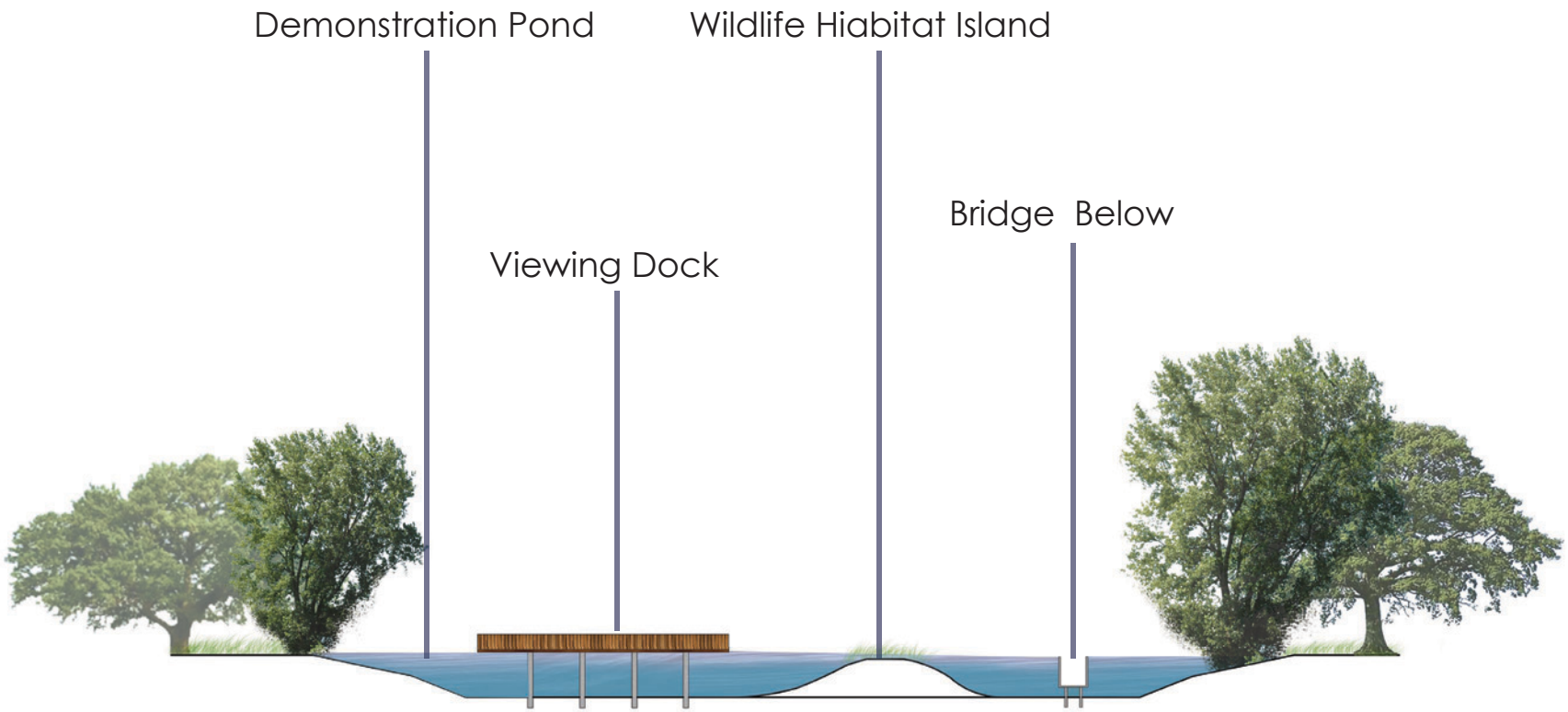


Fig. 5.37 - Section B-B' Cuts through the viewing deck and the bridge below.

This section shows the relationship between the viewing platform/ stage to the bridge below. As seen in the section, the bridge is designed below the water to provide the experience of being encapsulated in a landscape where water is a prominent element. The island in the center will provide undisturbed habitat for wildlife.

The Bridge Below

Fig. 5.38 This perspective shows the view from the bridge towards the tower. This tower gives visitors the ability to see the landscape in a broader view. The idea is for the visitors to be able to see the industrial landscape in the distance, and the reclaimed/restored landscapes in the foreground.

Looking at the pond from west to east, the common landscape of a pond reoccurs to display the revegetation of a riparian landscape. To enhance the experience, the bridge below brings visitors down below water level so that visitors feel enclosed in a space, and may be able to interact with the water if water level rises.

Conclusion

The San Joaquin River remains an icon within the central valley, providing a vital resource in the growth of the economy and environmental landscapes. With the continuous alterations along and adjacent to the river, the physical and natural productivity of the landscape becomes degraded. The functionality of the river has taken a downfall and presence of the river non-existant in certain reaches.

By creating awareness of the issues affecting the San Joaquin River, visitors are more conscious of the impacts that they can make on such a landscape. With that, future conservation and restoration projects will show higher support. The San Joaquin River is a vital resource that has been heavily degraded by human practices, and this project has helped display its significant history and importance in the landscape through the design of an interpretive center.

References

California Department of Parks and Recreation. (2013).Educational and interpretive classification. Retrieved from http://www.parks.ca.gov/?page_id=24132

Center for Creative Land Recycling. (2013). Design and remediation. Retrieved from http://www.cclr.org/case-studies/design-remediation

Center for Land Based Learning. (2011). Slews habitat restoration. Retrieved from http://landbasedlearning.org/why-slews.php

Collins, B. (1995). Riverine gravel mining in washington state, physical effects with implications for salmonidhabitat, and summary of government regulations.U,S, Environmental Protection Agency, Retrieved from http://yosemite.epa.gov/r10/omp.nsf/webpage/riverine gravel mining in washingtonstate, physical effects with implications for salmonid habitat, and summary of government regulations/$file/910-r-95-005.pdf

County of Sacramento Municipal Services Agency, . "Sacramento county American River Parkway Plan 2008." (2008): n. page. Print.

EPA, . "Rivers and Streams." United States Environmental Protection Agency. EPA, 13 Mar 2013. Web. 19 Mar 2013. <http://water.epa.gov/type/rsl/>.

Harker, Donald, Gary Libby, Kay Harker, Sherri Evans, and Marc Evans. Landscape Restoration Handbook. New York: CRC Press, 1999. Print.

International Commission on Large Dams. (n.d.). Role of dams. Retrieved from http://www.icold-cigb.net/GB/Dams/role_of_dams.asp

McDonnell, Mark J. "The History of Urban Ecology- An Ecologist's Perspective." Urban Ecology- Patterns, Processes, and Applications. 2011. (2013): 1-13. Print.

National Research Counsil, . Riparian Areas: Functions and Strategies for Management. Washington, D.C.: National Academy Press, 2002. Print.

Porritt, J. (1991). Save the earth. Andrews McMeel Pub.

“San Joaquin River Parkway Master Plan.” San Joaquin River Conservancy. N.p., 20 07 2000. Web. 1 Mar 2013.

Society of Urban Ecology, . “Society of Urban Ecology.” . N.p.. Web. 19 Mar 2013. <http://www.society- urban-e cology.org/Dokumente/SURE_statute.pdf>.

The Nature Conservancy. (2013). California: San joaquin river and wetlands. Retrieved from http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/california/placesweprotect/san-joaquin-river-and-wetlands.xml

The world Bank Group. (2001). What is sustainable development. Retrieved from http://www.worldbank.org/depweb/english/sd.html

United States Environmental Protection Agency. (2013, April 16). Region 9 strategic plan, 2011-14. Retrieved from http://www.epa.gov/region9/strategicplan/sanjoaquin.html

Veverka, J. A. (2013). Tips and concepts for planning truly "interpretive" exhibits. Retrieved from http://portal.uni-freiburg.de/interpreteurope/service/publications/recommended-publications/veverka_truly_interpretive_exhibits.pdf

Wampler, P. J. (2012). Rivers and streams - water and sediment in motion. Nature Education nowledge,3(10),18. Retrieved from http://www.nature.com/scitable/knowledge/library/rivers-and-streams-water-and-26405398

Wohl, E. E. (2004). Disconnected rivers. New Haven and London: Yale University Press.

Yolo Basin Foundation. (2013). Wildlife area. Retrieved from http://www.yolobasin.org/wildlife.cfm

THANK YOU!