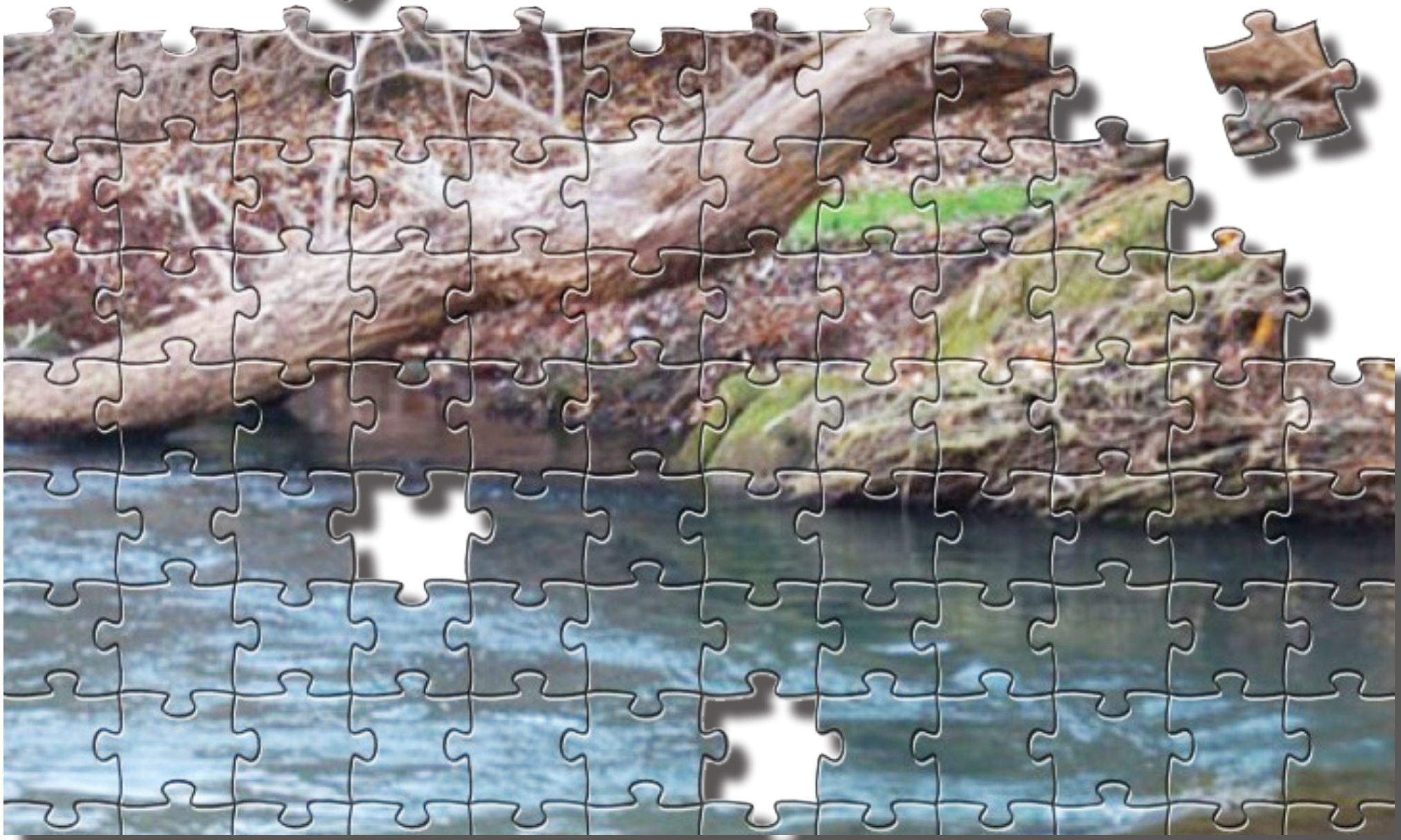
Putah Creek Corridor

Connecting the Pieces



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A Senior Project
Presented to the Faculty of the
Landscape Architecture Program
University of California, Davis
in Fulfillment of the Requirement
for the Degree of Bachelors of Science
in Landscape Architecture

Presented by:
Kathryn Salfen
at University of California, Davis
on the Tenth Day of June, 2011

Acknowledgements

I would like to thank my senior project committee members for their tremendous help. They all provided me with their knowledge, time and encouragement.

THANK YOU!

Claire Napawan

Steve Greco

Rich Marovich

Tara Hanlon

In addition to my senior project committee members, I would like to thank my parents for all their help not only during this project but for helping through everything!

Abstract

This project focuses on Putah Creek as it runs from Lake Berryessa to the Yolo Wildlife Area. It examines the corridor as both a wildlife corridor and as a local trail corridor. With many existing patches of wildlife reserves located along Putah creek, the restoration of riparian forest along the channel will provide full connectivity and functionality to the corridor. On the social scale Putah Creek runs between Winters and Davis. Connecting the existing trails of the UC Davis Riparian Reserve and Winters Putah Creek Nature Park will establish a local trail corridor. This project also examines the need of the design of the trails at Winter's Putah Creek Nature Park to Preserve linear corridors and creating multi-use trails that can allow wildlife movement across the landscape. Trails will follow the natural meander of the creek and provide picturesque views. The upper trail will be an extension of the path that the city will be implementing. A lower trail will give seasonal access to the creek in selected areas.

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Introducing
The Putah Creek Corridor

Past and Present

The Putah Creek watershed covers 810 square miles. The creek's origins are in springs on Cobb Mountain, part of the Macaymas Mountains. It flows through Middletown in the upper watershed and eventually empties into Berryessa Reservoir, which was first filled in 1957. Below the reservoir, there are about eight miles of cold 'tail water' stream that supports an important fishery for both hatchery and wild trout. The stream then flows into Lake Solano, a silt-filled reservoir created by Putah Creek Diversion Dam, which diverts the water for use in Solano County and at UC Davis. Below the diversion dam, the creek flows through a channel confined by levees through Winters, past Davis, and then into the Yolo Bypass. The Bypass is a flood control channel that drains into the Sacramento River. It is the wide area you cross on Interstate 80, between Sacramento and Davis.

(Fig. 1.1)

If a single theme stands out in the history of lower Putah Creek, it woudl be change. Lower Putah Creek has been modified from a free-flowing, unmanaged waterway to a regulated stream following an unnatural channel and supporting many non-native invasive species of plants and animals. The creek once supported over 22,000 acres of lush riparian forest between the foothills and the Sacramento River, but now supports only a tiny fraction of that.

The Patwin people were our predecessors as the human inhabitants the region. They lived here for centuries, modifying the landscape through the use of fire and exploitation of the large animals. However, much larger changes to the landscape came about only after the Patwin were eliminated by disease, dislocation, and murder. In the early 1800s Spanish and Mexican people settled here, in the period of land grant rancheros. The Spanish released semi-wild longhorn cattle into the region and soon huge herds were trampling the landscape. With the coming of statehood in 1850, land ownership became mroe organized and land went mostly to newly-arrived settlers, who plowed the land and diverted the streams for irrigation.

Isaac Davis and his son, Jerome, were early settlers who owned a large farm on Putah Creek. In 1867, Jerome Davis sold a large tract of land to promoters from the California Pacific Railroad and he set the stage for rampant land speculation and the development of "Davisville" as a train stop. In the early years, Davisville was periodically flooded by high flows from Putah Creek. In 1872 efforts began to divert Putah Creek away from the city. These efforts resulted in the dredging of a connection to a former channel, the "south fork" of the creek, which is the present-day creek channel. The levees on both sides of the creek bed are the remains of this early dredging operation, which was enlarged by the Army Corps of Engineers' Putah Creek Project in 1943-49. As a result of the straightening of the channel, the stream cut downward, creating a channel that is 10-20 feet lower than the original stream bed. This down-cutting was largely halted by the elimination of most flood flows with the ending with the completion of Monticello Dam in 1957. The former flood flows are now stored in Berryessa Reservoir.

(Fig. 1.2)

(Fig. 1.3)

(Fig. 1.4)

Monticello Dam

Immediately upstream of Cold Creek's confluence with Putah Creek stands the massive wall of Monticello Dam. In the early 1900's, Berryessa Valley (now underneath Lake Berryessa) was a flat, fertile valley bisected by Putah Creek. In 1957, Solano Irrigation Distric copmleted the contruction of Monicello Dam. The purposes for this dam were (1) to store water in Berryessa Reservoir for agricultural, urban, industrial, and military uses, (2) to reduce flooding of lands along lower Putah Creek, and (3) to provide recreational benefits.

Stebbins Cold Canyon Reserve

South of Monticello Dam, Stebbins Cold Canyon Reserve is one of 26 reserves in the University of California's Natural Reserve System. Today's use of Cold Canyon by people as a research area and hiking spot. The trail through the reserve is the remains of a road built by John Vlahos. The hills above are ribbed with the trails created by several hundred years of livestock grazing. The number of visitors to the canyon varies consistently with favorable weather, but the trails are open all year round and become well-worn after the winter rains.

Lake Solano Regional Park

Lake Solano Regional Park is a geologic relic encompassing wild and rocky outcroppings that have existed since the dawn of time. Wild critters still roam and can be glimpsed in the early mornings. The park is owned and operated by Solano County. It encompasses 45 acres on both sides of Pleasants Valley Road, plus shoreline leased from the Bureau of Reclamation on the 100-acre lake.

(Fig. 1.5)

UCD Riparian Reserve

The Putah Creek Riparian Reserve was set aside by the University in July, 1983. The aim of the reserve is to preserve a portion of the once-abundant riparian habitat along the creeks riparian corridor. The reserve protects some areas of the Central Valley riparian forest, provides wildlife habitat, and greatly increases opportunities for study, observation, and enjoyment of riparian plants and animals.

(Fig. 1.6)

Vic Fazio Yolo Wildlife Area

The 16,000-acre Yolo Wildlife Area is one of the largest public/private restoration projects in the nation with 3,700-acres of land in the Yolo Bypass flood way that had been restored to wetlands and other associated habitats. The Yolo Wildlife Area provides a wide variety of benefits such as flood control wildlife and habitat management and recreation and education uses. The Yolo Wildlife Area is located within the Yolo Bypass. The bypass is a flood control structure within the historic Yolo Basin floodplain, whose boundaries are defined by constructed levees. It carries Sacramento River water at overflow to the Delta and is operated as part of the Sacramento River Flood Control System. It is open to the public, 7 days a week from sunrise to sunset. The Yolo Wildlife Area is the site of the Discover the Flyway program for schools implemented by the Yolo Basin Foundation and in partnership with the California Department of Fish and Game. More than 3000 students and parents visit the area annually to learn about the importance and beauty of this local wetland and its significance to their lives.

(Fig. 1.7)

Winters Putah Creek Nature Park

In 1995, a riparian restoration plan was adapted for a portion of Putah Creek in the city of Winters. The Lower Putah Creek Coordinating Committee received funding and began restoring 1,350 feet of the Putah creek channel as designed by UCD Landscape Architect Student Cheryl Sullivan. The project involves convertion of former gravel extraction pits into river parkways and creating public access where it is now prevented by steep banks and invasive weeds. This restoration of the Winters Putah Creek Nature Park (PCNP) is an integral part of the revitalization of downtown Winters. The PCNP aims to integrate the creek into the community by providing access to native riparian habitat and related recreational opportunities. Plans for the PCNP include improvements to the ecological functions of the creek. These plans will maximize open space and habitat value for the Winters community by enhancing recreational uses while simataneously restoring native habitat.

(Fig. 1.8)

Putah Creek as a Wildlife Corridor & Trail System

Putah Creek runs from Lake Berryessa to the Yolo Bypass. Naturally the creek connects the Pacific Border Provedence mountains to the Central Valley, making it the ideal widlife corridor. With many existing patches of wildlife reserves located along Putah Creek, the restoration of riparian forest along the channel will provide full connectivity and functionality to the corridor.

On the social scale Putah Creek runs between Winters and Davis. Other than automibles, there is no safe corridor to travel as a biker or pedistrian that connects the two cities. Davis has the UC Davis Riparian Reserve trails providing bike and pedestrian access along the creek. Winters will soon have the trails of Winters Putah Creek Nature Park to provide the same access. The next step would be to connect the trails together and provide the needed Winters-Davis connection.

Goals

1.) Comple restoration of Putah Creek as an effective wildlife corridor

2.) Provide apedestrian friendly connection between local communities

3.) Use of best management practices in design of trails interacting with wildlife habitat

4.) Promote outdoor enjoyment and environmental education

Challenges

1.) Property Issues: portions of the path abut private property.

2.) Multiple Jurisdictions/ Property Owners: Putah Creeks marks the boundary between Yolo and Solano counties. This may cause challenges when negotiating use that crosses this boundary.

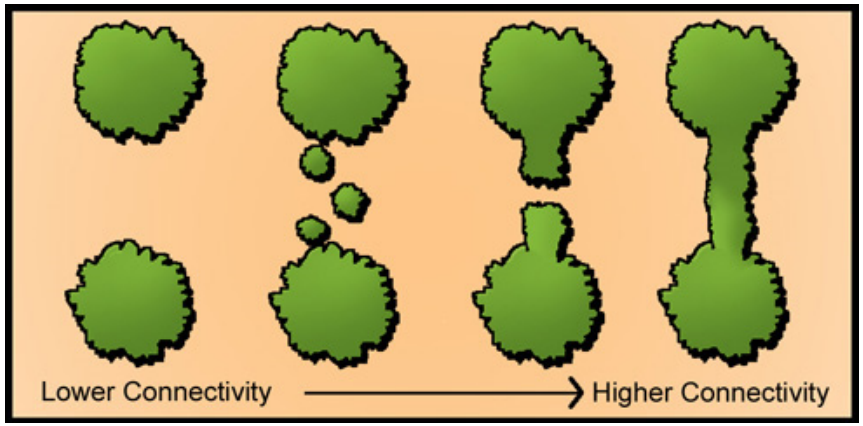
3.) Safety: Due to the isolated characteristic of the riparian habitat safety may be a concern.

Putah Creek as a Wildlife Corridor

Function and Connectivity

Functional connectivity is measured according to the potential for movement, dispersal and interchange amongst population of a particular target species (Taylor 1993). Habitat connectivity is affected by various characteristics such as mobility, dispersal, auto ecological, structural, spatial patterns, distance between patches and interference from humans and natural predators. Network connectivity and circuitry helps determine the complexity of the network and the effectiveness of species movement. Small patches or nodes along a network are very effective in providing habitat suitable for species reproduction, thus creating more habitat and habitat movement throughout the network. Landscape patterns that promote connectivity for species, communities and ecological processes are key elements in nature conservation.

At the landscape scale, connectivity has been defined as "the degree to which the landscape facilitates or impedes movement among resource patches" (Bennett 1999). It is critical to recognize that a landscape is perceived differently by different species and so the level of connectivity varies between species and between communities. A particular landscape can provided high connectivity for some organisms and low connectivity for others. The structural component of connectivity is determined by the spatial arrangement of different types of habitats in the landscape. It is influenced by factors such as the continuity of suitable habitat, the extent and length of gaps, the distance to be traversed and the presence of alternative pathways or network properties. Land cover can be composed into matrix, patches and linear elements. Landscape matrix is a dominant surrounding land cover within a natural or cultural landscape gradient. Matrix promotes connectivity, networking, resistance and permeability within and through the landscape (Forman 1995). Landscape patches range in origin, size and shape. A patch can originate from remnant elements, regenerated natural areas or human and natural disturbances.



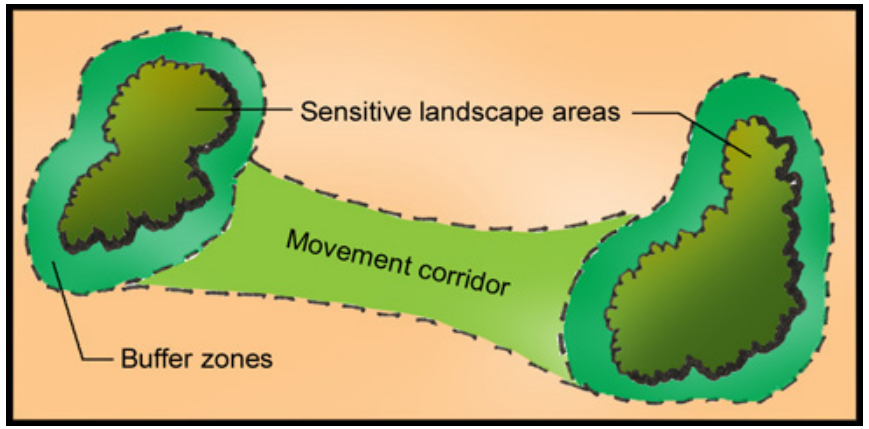
(Fig. 2.1)

Landscape corridors are lines, strips, road and/or stream. The basic function of corridor works with habitat as conduit, barriers, filters, sources and sinks. Successful use of corridors depends greatly on its width and connectivity (Taylor 1993). For example, a gap within or between corridors could greatly limit the movement of a rabbit due to lack of cover while at the same time acting as a great stepping stone for migrating birds.

Landscape function processes energy and nutrients and provides habitat for people, plants and wildlife.

Landscapes change in structure, function and ecological scaling throughout time. The largest change in the structure and function of the landscape is due to human activities on the land though out history. Our cities and communities are built in a way that mirrors habitat fragmentation. The concept of providing linkages for conservation can be applied at several scales. It is relevant both to local conversation efforts and to regional or national strategies. Multiple corridors and multiple connections between the corridors creates alternate routes and escape routes increasing successful movement within the network and therefore reducing the negative effects of gaps, disturbances, predators and hunters within one corridor or patch (Forman 1995).

Unfortunately disturbances, natural and human, are common and continual throughout the landscape. This is why



(Fig. 2.2)

landscape ecology and habitat connectivity must be used when designing parks, open spaces or greenways. For example, when implementing a new park on a large scale the best design will have a conservation area more circular in shape, a buffer zone used for passive activities between the conservation area and the active area. This provides a successful change to the landscape without brutally shocking the habitat. Always a good idea is to use native plant life to help with the threat and spread of exotic species.

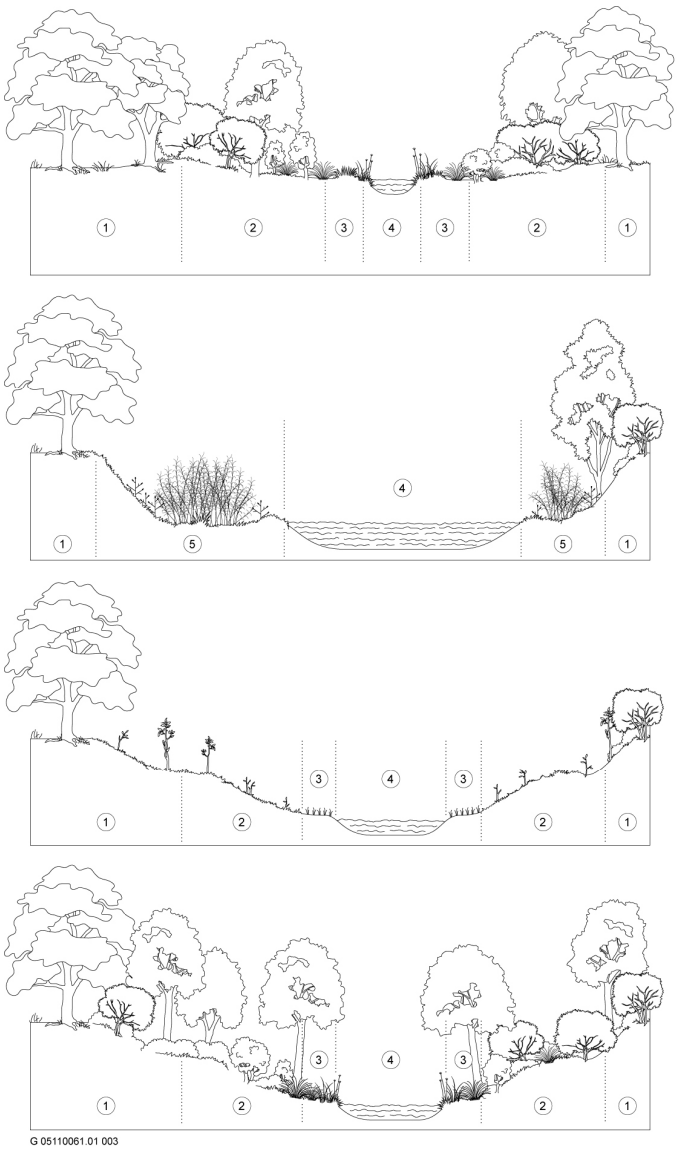
Key:
① **Valley Oak Savannah**
② **Mixed Riparian Forest**
③ **Freshwater Marsh**
④ **Low-Flow Channel**
⑤ **Invasive Vegetation**

Historic Condition
- Small flow channel
- Wide floodplain
- Floodplain frequently inundated during storm events

Impacted Reach
- Incised, overwidened channel
- Limited active floodplain
- Disconnected historic floodplain
- Steep eroding banks
- Invasive vegetation (e.g., arundo, tamarisk, starthistle, eucalyptus, blackberry)

Restoration Implementation
- Restore channel dimension (based on current flow regime)
- Stabilize/recontour streambanks
- Restore active floodplain
- Remove invasive plants
- Revegetate with native plants
- Install instream fish habitat features
- Remove trash

Future Restored Ecosystem
- Self-sustaining, weed resistant native vegetation
- Functioning floodplain
- Stable banks
- Shaded channel
- Wildlife/bird/aquatic habitat



The Historic, Impacted and Restored Condition for a Typical Reach of Lower Putah Creek

Exhibit 3-1
(Fig. 2.3)

Vegetation

The Putah Creek wildlife corridor features four possible native habitats that have overlapping vegetation plant distribution. The dispersal of vegetation range from over-story, mid-story, understory, thickets, bank edges to underwater plains. A majority of the plantings are good for ecological restoration and will provide abundant cover, forage variety, and roosting location and nest-building materials for the target wildlife specie. Native vegetation also contributes to water cleansing by removing nutrients from agricultural run-off. The vegetation increases aeration to the soil and creates places where water can slowly percolate, recharging the ground water. This is an important fact since much groundwater recharge has been decreased by flood control. Native vegetation slows bank erosion and directs flows away from structure and roads. Overall, each of the four landscapes is distinguished and together forms a diversity of land mosaics that can support the suitability and sustainable of habitats for wildlife species and vegetation.

Historically invasive species would not be able to survive Putah Creek's large, long, and fast winter flooding. Many native plants have evolved to stay low, surviving under the fast winter flow. Most invasive species would die out or be washed away during winter's storms due to their inability to survive the extremes of the riparian habitat. Lack of groundwater recharge due to flood control has greatly diminished the potential area where riparian habitat can grow. Riparian vegetation is classified by its water intensive nature and without ground cover many riparian species cannot survive without the creek's year round water supply. Putah Creek has now been greatly over run by non-native invasive vegetation.

Key Invasives to remove:

-Eucalyptus (Eucalyptus spp.)

-Himalayan Blackberry (Rubius discolor)

-Arundo (Arundo donax)

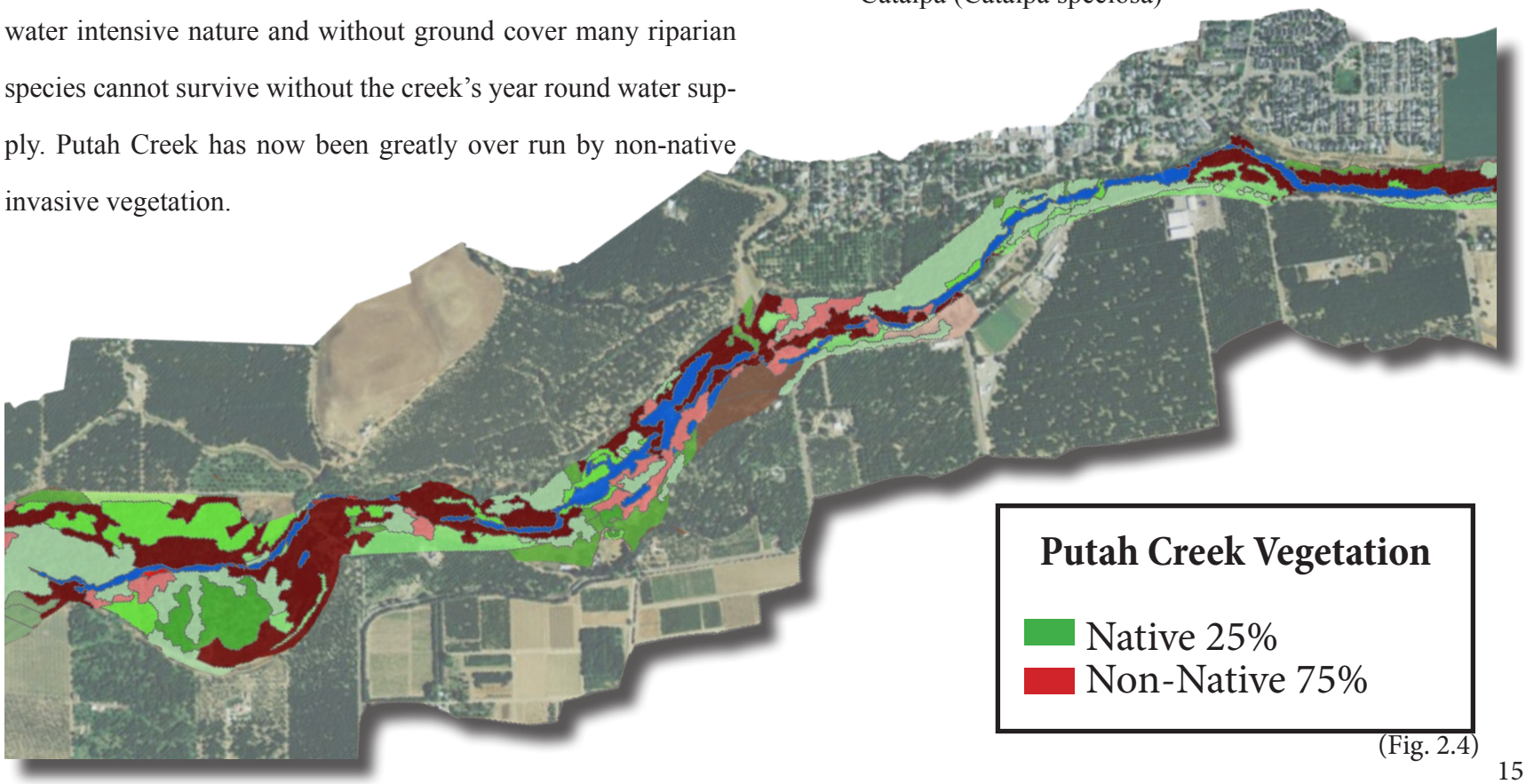
-Tamarisk (Tamarisk spp.)

-Tree of Heaven (Ailanthus altissima)

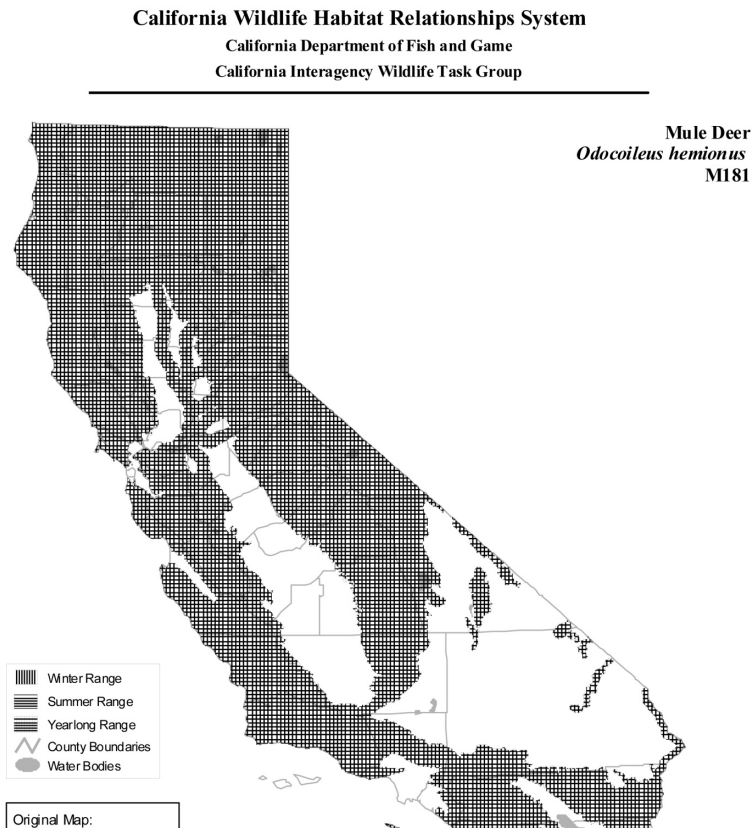
-Eurasin Milfoil (Myriophyllym spicatum)

-Black Locust (Robinia pseudoacia)

-Catalpa (Catalpa speciosa)



(Fig. 2.4)



(Fig. 2.5)

Designing for Wildlife

The Mule deer (*Odocoileus hemionus*) population is distributed in a board range of habitats throughout California but distribution is significantly absent where intense agricultural practices, water rechanneling, and clearing for residential developments are dominant activities in the region. Mule deer are yearlong or migratory residents and have distinct home ranges of less than two square miles and reside within a mile diameter of suitable habitat. Moreover, water source habitats that provide woody cover, abundant edges, and an availability of quality forage are preferred conditions of the Mule deer. Range movements occur for seasonal shifts along mosaic vegetations and elevations; migratory activities are influenced heavily on climate changes and forage quality, quantity, and variety.

Mule Deer Habitat Along Putah Creek

(Fig. 2.6)

Suitable habitats for Mule deer include chaparral, oak woodlands, grasslands, and riparian areas and these habitats supply a range of food sources and covers. A migratory pathway connecting summer and winter ranges along Putah Creek would encourage Mule deer dispersal in the Central Valley and increase the deer population by restoring habitable biome in the region.

(Fig. 2.7)

Design components for a Putah Creek corridor will provide Mule deer with accessibility to edges, openings, mosaic vegetation, free water, thermal and protection covers, and abundant forage. A riparian buffer zone implemented along Putah Creek will provide a greenway for wildlife activities suitable for Mule deer and other species.

(Fig. 2.8)

Putah Creek as a Trail Corridor

Significance

The creation of trails and paths within a neighborhood and connecting adjacent neighborhoods will reduce reliance on automobiles and their associated environmental impacts. Trails and paths are most effective when they are part of a system that assures connections, continuity, access, and safety. Where appropriate these routes should link with other existing long distance routes. Greenways, river corridors, canal right of ways, and abandoned railroad lines present opportunities for the creation of paths and trails serving larger areas. Many corridors offer exceptional landscapes and rich experiences for the trail users, but significant work is still needed to give the trail a personality of its own. To create successful trail experience you must consider the perspective of the user. "Since landscape is usually experienced by a moving observer," author Kevin Lynch writes, "it is not the single view that is important as much as the cumulative effect of a sequence of views" (Ryan 1993). Trails are multidimensional, with things to see, hear, smell, feel and even taste along the way. Users will have emotional, intellectual, and spiritual reactions to a trail experience.

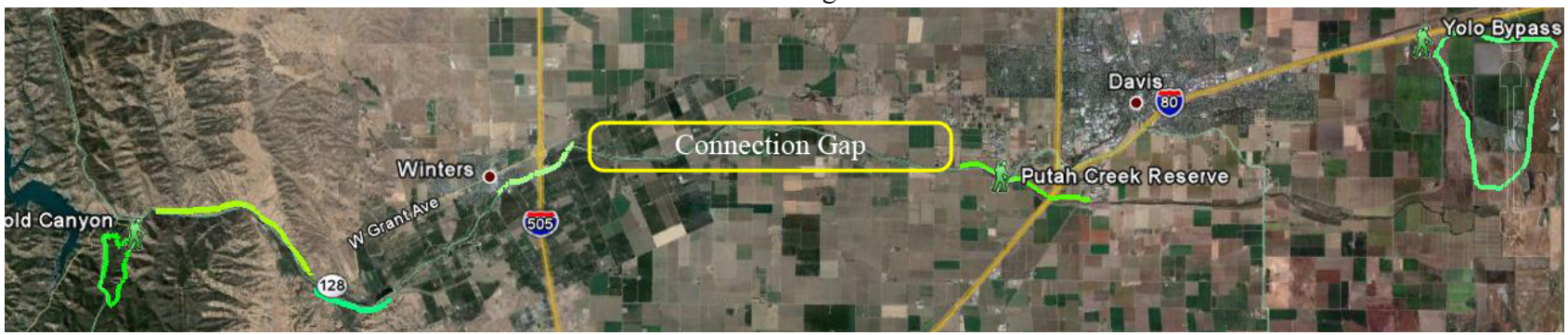
A trail planner needs to understand the trail's effect on wildlife and plants and how to develop a trail that will enhance habitat. Nature trails are created to provide access for humans to the vast ecosystems of the world. The main purpose of trails is to create the opportunity for humans to get out into nature and enjoy it. Trails are a relatively small component in the environment, but a trail and its users do alter it. Trail and path networks need to be developed in an environmentally sensitive way, reconciling the needs of path users with those of nature conservation. You could look at nature trails as roads to conservation and preservation. Once people are exposed to the beauty and power of nature, they begin to understand the importance of protecting it.

Existing trails

A majority of Putah Creek is open to the public for walking, running, or bicycling. Between the trails at Lake Berryessa, Stebbins Cold Canyon Reserve, and Lake Solano, hikers and bikers of Winters are easily able to travel West and explore Putah Creek. The same is true of Davis bikers and hikers who have the UC Davis Riparian Reserve, Davis Bike Loop, and Yolo Wildlife area providing them with trails that allow pedestrians to travel east. There is even a bike trial that connects Davis to West Sacramento.

There is currently a missing connection between the city of Winters and the City of Davis. The route one takes from Davis to Winters begins at Russell Boulevard and Hwy 113. Head west and follow the bike path to its end. Once a biker turns left on Stevenson Bridge Road there are no longer any bike lanes or even road shoulders to ride on. This dangerous ride continues with a right onto Putah Creek Road which will lead you all the way to Winters and an old railroad bridge that's been converted into a pedestrian bridge.

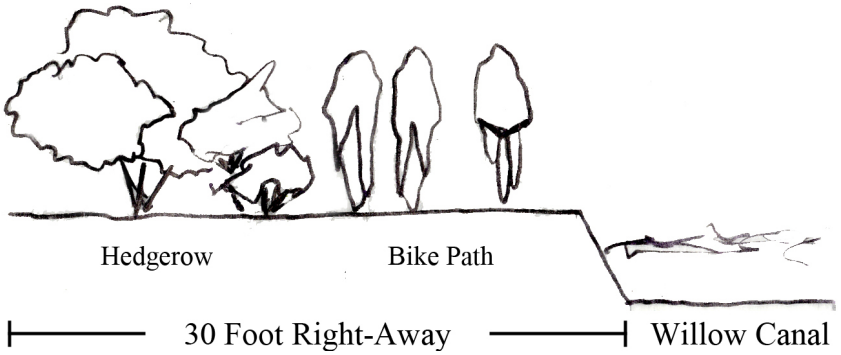
UC Davis Riparian Reserve trails stretch West along Putah Creek just past Pedrick road and the trails of Winter's Putah Creek Nature Park stretch East to State Highway 505 with the opportunity to extend to Yolo Housing. Connection of Davis to Winters can be complete by connecting these two trail systems together.



(Fig. 3.1)

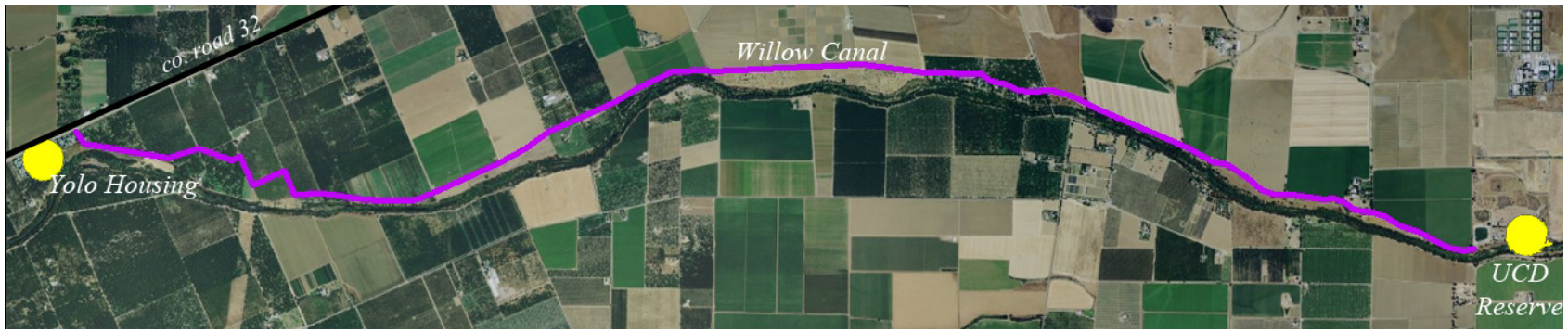
The Davis - Winters Connection

One possible connection lies along side of the Willow Canal. Willow Canal is an agriculture irrigation canal that runs beside Putah creek between the UC Davis Riparian Reserve and Yolo Housing. Solano Irrigation District currently holds an easement on the canal that provides a 30 foot right-away on the canal for maintenance purposes. Establishment of a new easement or the modification of the existing easement would successfully provide a safe and functional pedestrian connection between Davis and Winters.



(Fig. 3.2)

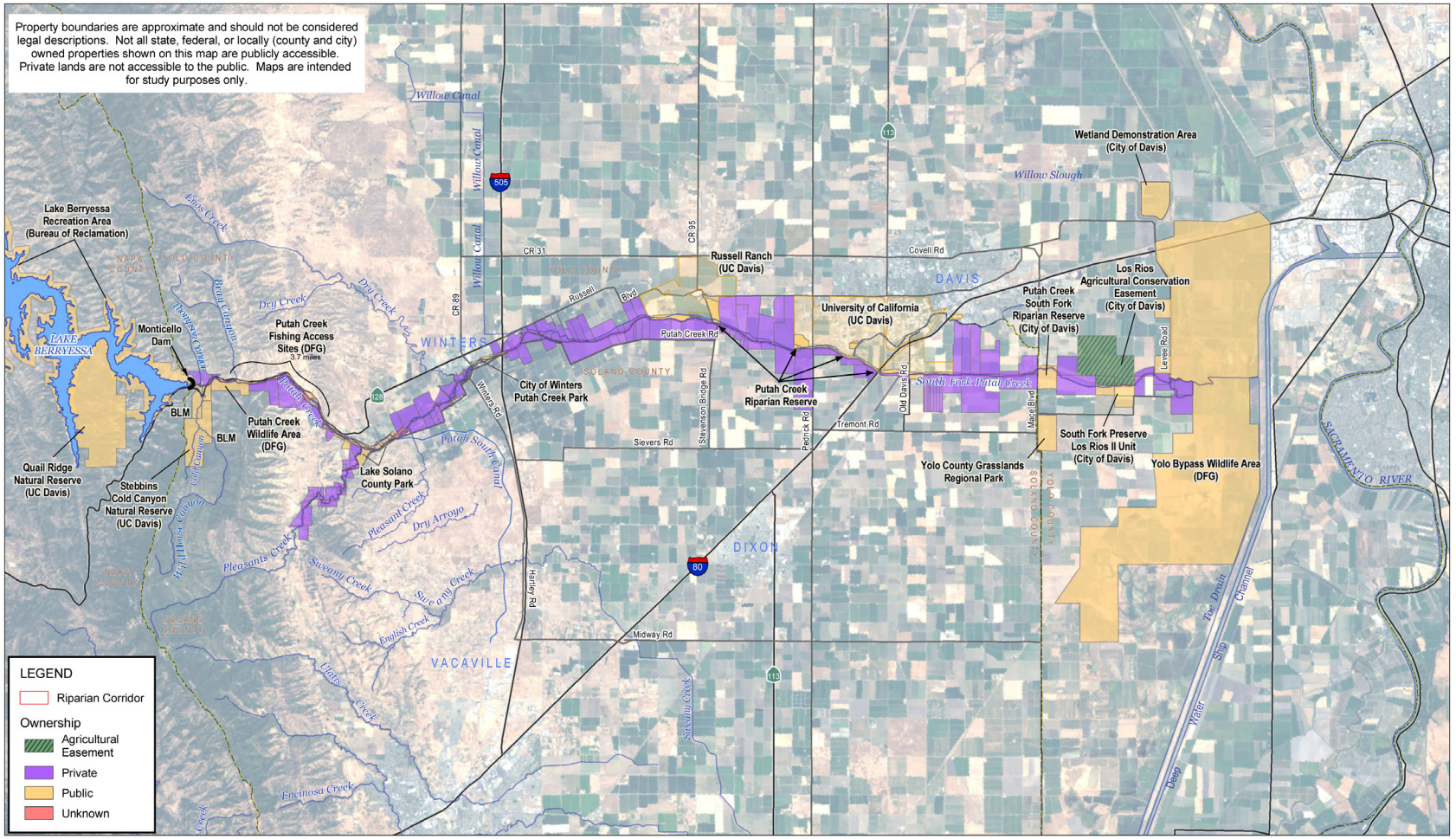
The canal trail will allow for a two way bike and pedestrian path with a hedgerow fence. The hedgerow will provide a necessary barrier from the surrounding farm land along will beneficial pollinator habitat. The trail will run opposite of houses that may be next to the canal. Proper research and contact with landowners is necessary to design for their concerns. Features such as gates, fences and signs will be a few of the features that provide security and safety for both landowners and trail users.



(Fig. 3.3)

Property analysis

The property analysis looks at who owns the properties that the conceptual trail would transverse. Landowner's preferences should be taken into consideration when path planning and implementation are taking place, even when the path will not be located on private land.



(Fig. 3.4)

Public Lands

Public lands account for 2,934 acres, or 21.2% of the parcels within and adjacent to the creek corridors. Public lands include those owned and/or managed by the State, City of Davis, UC Davis campus, UC Davis Russell Ranch, UC Regents, Bureau of Reclamation, City of Winters, State Board of Equalization, Solano Transportation, and federally-owned lands. Public land uses generally include park lands, wildlife areas or reserves, or conservation areas.

Landownership Distribution Within and Adjacent to Lower Putah Creek Riparian Corridor

Land Ownership	Acreage	Percent of Total Acreage
Private	10,824	78
Public	2,934	21.2
Unknown	117	0.8
Total	13,875	100

(Fig. 3.5)

Private Lands

There are over 100 different private landowners that own property in and adjacent to the lower Putah Creek riparian corridors. Private lands within and adjacent to the riparian corridors account for 10,824 acres, or 78% of the creek and creek-side parcels. A number of local and regional farming businesses are among the landowners along lower Putah Creek, including Los Rios Farms, Nishi Farms, Glide Ranch, Mariani Nut Company, and M&L Fruit Company.

Property owners are rightfully worried about having publicly accessible areas near their properties. In this site what makes this issue especially hard to deal with is the fact that the area is not easily accessible for emergency services. Some of the issues include: trespassing, vandalism, theft, liability and other criminal activity.

Designing for the

Trail and Wildlife Corridor

Impact of trails on wildlife

Recreation has many different impacts on the environment that call for difference management practices. One major impact is on the soil. Trampling compacts soil particles, reducing the amount of pore space between particles. “The larger pores, those that promote good soil drainage and are normally occupied by air, can be nearly eliminated” (Monti and Mackintosh 1979). This change reduces both germination success and the vigor of plants and can be detrimental to soil-dwelling organisms. Trampling can also crush, bruise, shear off and uproot vegetation through creation of informal trail networks. This change leads to reduce vigor and less successful reproduction, often leading to plant death. “Consequently, vegetation in tramples places gener-

ally has less biomass, sparser cover, different structure and different species than in undisturbed places" (Cole 1995). Recreation also plays a role in introducing exotic species, which are carried into the disturbed area and soon become invasive and over powering to the local native species. Recreation has the greatest impact on wildlife habitat. Four general ways in which recreational activities can affect wild animals are harvest, habitat modification, pollution and direct disturbance. Animals can be harvested through hunting or fishing. Their habitats are modified both intentionally and unintentionally. Animals suffer from pollution, litter and food left by recreationists. Direct disturbances occur when human activities come too close to animals. "It can reduce the effective sizes and habitat quality of an area and even destroy a greenway's value as a migration corridor" (Cole 1995).

(Fig. 4.1)

Strategies to help reduce impact include, limiting uses and activities, influence behaviors, and control timing and location of the use. Small signs that read "Fragile Habitat – Area Closed" placed in front of the brush can help keep people off the unofficial trails. Observing visitor behavior led to the idea for a larger overlook platform that will concentrate use and shield the rare plants from visitors. Trails within parks and greenways change its surroundings through an effect called a zone of influence. The zone of influence varies along the trail depending on local conditions. It is always best to design trail with their zone of influence in mind. Good rules to follow include looking at the broader view, sensitive vs. non sensitive species, negative effects, edges, degraded areas and screening. Preserving linear corridors and creating multi-use trails can allow wildlife movement across the landscape.

Trail Design

The actual design of the trails system will incorporate the following best management practices of trail systems:

-Accommodate all users

-Design trails to discourage unwanted diversion off the trail surface

-Provide buffer zones between trail edge and potentially sensitive areas

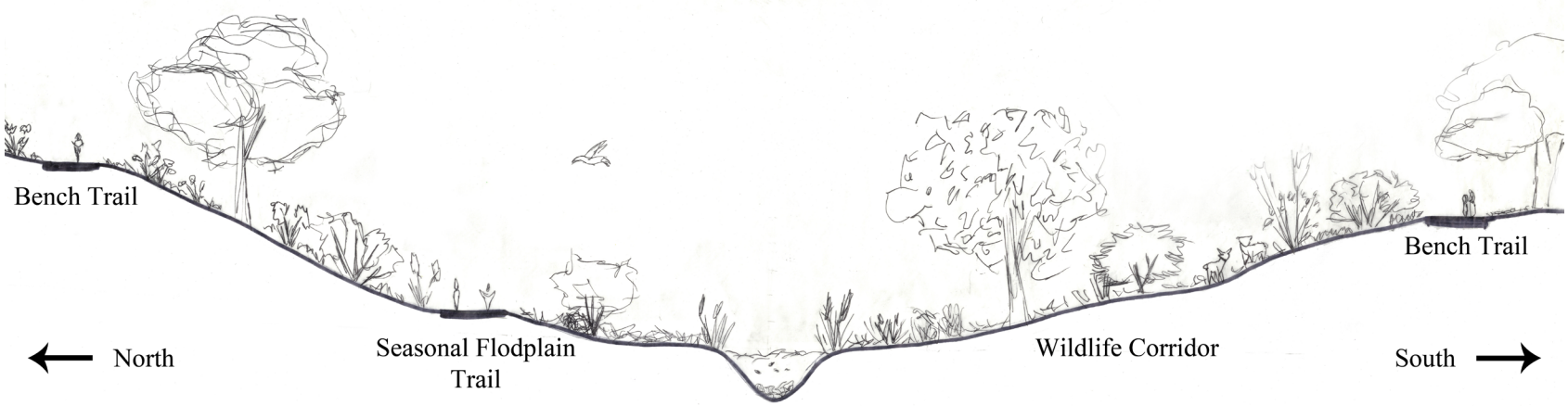
-Direct trail away from areas of critical or sensitive habitat

-Develop interpretive vistas and observation points for viewing wildlife where appropriate

-Provide informational and interpretive signs that make the public aware of wildlife value along the trail corridor

-Choose a trail surface that has minimal environmental impact

(Fig. 4.2)



(Fig. 4.3)

The North bank of Putah Creek will act as the active park of Winer's Putah Creek Nature Park. The upper bench will be open for both pedestrians and bikers. There will also be seasonal lower bench trails with access to the water. These trails will be foramed from the main trail by users exploring the site. Trail side vegetation will fram picturesque views of the creek as it is being explored.

The South bank will act as the passive nature park designed to yield to wildlife movement. Use of hedgerows can provide cover and protection for birds, small mammals and other wildlife. They can also promote the growth of a broad range of plants near the trail by sheltering seeds, preserving humidity and protecting the area from users. There will only be an upper bench trail to allow the side bank to function as a functional wldlife corridor.

(Fig. 4.4)

(Fig. 4.5)

Wildlife Viewing Platform

The remants of the old percolation dam provides the perfect base for a wildlife viewing platform. A viewing platform will give users a non-intrusive way to interact with the wildlife.

Informal Trail Seating

Realiment of the creek and re-establishment of a functioning riparian floodplain will involve removal of large bolder riprap that has been used for erosion control. These bolders can be re-used as informal trail side seating and other trailside features.

Public Access of Putah Creek

Canoeing, kayaking and swimming are activtives enjoyed by the Winter's community. A dual launch and beach area will be very beneficial. It was requested by the local Priest to have an area were he can perform baptisms.

(Fig. 4.6)

Educational and Interpretive Signs

The more one knows about their "home", the more they are likely to want to protect it. This is an example of what the signage could look like depending on the location and content. The shape of the roofs on these kiosks are mindful of the past Patwin Presence on Putah Creek.

Informational signage will be placed in various locations around the site. Each sign or "station" will have a specific theme depending on where it is on the site. One theme example could be Native vegetation with facts about the habitat, use by wildlife or humans, and cultural significance.

(Fig. 4.7)

(Fig. 4.8)

(Fig. 4.9)

(Fig. 4.10)

(Fig. 4.11)

(Fig. 4.12)

(Fig. 4.13)

Vegetation

The plant palette will mimic the riparian vegetation that grows in a gradient from low to high elevation along Putah Creek.

-Valley Oak (*Quercus lobata)*

-Blue Elderberry (*Sambucus caerulea)*

-Western Red Bud *(Cercis occidentalis)*

-Fremont Cottonwood *(Populus fremontii)*

-Sandbar Willow *(Salix exigua)*

-California Fuschia *(Epilobium canum)*

-Rushes *(Juncus sp.)*

-Sedges *(Carex sp.)*

Along the South bank trail, hedgerows as vegetative barriers between the public and habitat sensitive wildlife corridor will be more effective and aesthetically pleasing than installing fences. The hedgerows would be planted with native vegetation that grows into a natural barrier due to density and barbed nature. Some recommended plants for hedgerows with the purpose of vegetative barriers include:

-Wild Rose (*Rosa californica*)

-Coyote Brush (*Baccaris pilularis*)

-Toyon (*Heteromeles arbutifolia*)

Material

The construction of the trail will take place after channel realignment and re-vegetation has taken place. Terraces should be fairly compact in order to prevent paths to be washed away in winter storms. The paths may benefit from increased stabilization within ground metal honeycomb buried within the top layer of path soil where additional support may be needed. The material placed on the path should be if possible local materials of decompose granite or stabilized soils.

(Fig. 4.14)

Conclusion

Putah Creek is beatuiful. It is an amenity that should be experienced by all, man and animal. Its a habitat connector for the wildlife and would become a connection between the city of Winters and the city of Davis. This area carries a variety of meaning to many people, and this site is ideal for teaching environmental stewardship and cultivating an appreciation and an understanding of the area. This idea would extend to other areas of natural beauty, as many users would find themselves with great appreciation and respect for the environment.

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