



Santiago Creek

VISION PLAN

Santiago Creek

VISION PLAN

A strategic visioning proposal for the Santiago Creek riparian corridor in the City of Orange

Prepared by: City of Orange and the National Park Service, Rivers, Trails & Conservation Assistance Program and the Santiago Creek Greenway Alliance, with support from the Wildlands Conservancy.



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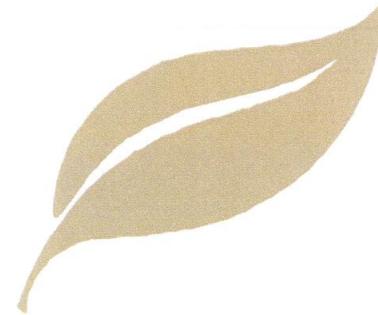
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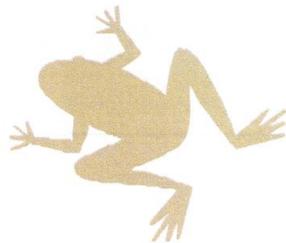
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Abstract

This document describes a Vision Plan for a greenway, multi-purpose trail system and healthy watershed along Santiago Creek in the City of Orange. The plan is the result of a study conducted by the City Community Services Department (www.cityoforange.org) and the National Park Service, Rivers, Trails and Conservation Assistance Program (www.nps.gov/rtca). The primary goals of the Plan are to:

1. Develop a continuous multi-purpose trail on the upper bank of the creek (uplands area).
2. Create a greenway along the creek by restoring the creek bed and its adjacent uplands with native trees and shrubs.
3. Maximize ground water recharge by restoring the creek bed in specific areas.
4. Maintain or improve existing level of flood protection.

The study area encompasses 894 acres that comprise the Santiago Creek waterway and all adjacent undeveloped properties largely publicly-owned. It extends from the southwestern city limit (where the creek flows below the Garden Grove Freeway) to Santiago Oaks Regional Park in northeast Orange. It includes 758 acres of public lands and 136 acres of privately-owned property. The study findings have identified a potential for in-stream restoration of approximately 100 acres of riparian habitat with an additional 300 acres of uplands available for enhancement as oak woodland/riparian forest. There are several sites currently owned by public agencies that are available for restoration and trail construction. Some sites are privately owned but undeveloped. These properties are opportunities for acquisition and integration into the greenway and trail system. The study also provides some general guidance on how creek, greenway and trail improvements could be integrated into development proposals.

This plan was developed as a vision for the future of Santiago Creek. Following its adoption, more detailed proposals for specific projects will include evaluation of environmental resources and identification of project impacts.

Foreword

This document describes a Vision Plan for Santiago Creek primarily within the City of Orange. It is intended to promote long term actions leading to the completion of a trail system and greenway along the creek as outlined in the city's General Plan. Although early implementation of Plan elements are feasible and encouraged, progress may be incremental depending on factors such as grant opportunities financial resources and organization of volunteers. Santiago Creek is central to the City of Orange, currently dividing school attendance boundaries, the transportation system and postal ZIP code zones. When completed, the trail and greenway have the potential to augment the city's transportation system and unite the community along its principal natural resource.

This plan focuses primarily on the public lands that now exist along Santiago Creek. Private parcels are included only in cases where the creek's regular flow traverses the property. These parcels are included because existing flood protection standards and environmental regulations will affect future development, and landowners will be better served by background information compiled in this planning document. No tax increases or other funding mechanisms will be proposed as part of the vision process. Appropriate funding discussions and recommendations will occur during implementation processes, once the Vision Plan has been adopted.

Notwithstanding the city's increased leadership role, the waters of Santiago Creek are managed primarily by Orange County's Flood Control

District, Orange County Water District and the U.S Army Corps of Engineers. Nothing envisioned by this planning document will interfere with critical operations that promote public safety or the plans previously adopted by these agencies. They will continue to maintain the lead role in facilitating effective flood protection for Santiago Creek and the coastal plain of central Orange County. This plan supports effective flood protection for the Santiago Creek now and in the future. Implementation plans should be prepared to provide for public access and regular use by city residents. Greenway development has the potential to eliminate secluded gathering places that otherwise promote truancy, loitering, trespassing or vagrancy. It will also ultimately provide outdoor education opportunities for local schools and help teachers fulfill the state's curriculum.

The idea of a trail system and greenway along Santiago Creek is not new. It was initially proposed through local planning documents in the 1950s and 60s. It was included in Orange County's Santa Ana River-Santiago Creek Corridor General Plan for Recreation and Open Space (Eckbo, Dean, Austin and Williams 1971). Since that time the idea has been incorporated into several county and city studies and the activities of various citizens groups. The plan described in this document is a direct extension of these earlier plans as well as more recent efforts. The following Table is a list of the primary studies and plans to which this document is indebted. More detailed descriptions of the principal studies are given in Section 4.5 of this document.

Previous Planning Studies for Santiago Creek		
Published Documents	Publication Date	Agency(s)
Santa Ana River/ Santiago Creek Greenbelt Plan	March 1971 Revised October 1971	Orange County Planning Department Eckbo, Dean, Austin & Williams Citizens Committee of 100
Santiago Creek Recreation & Open Space Study	July 1971	City of Orange Planning Department
Sub Committee Final Report on Open Space	August 1, 1972	General Plan for the City of Orange Citizen's Committee to Review the Quinton- Budlong Plan
Orange Park Acres Specific Plan	August 1975	Orange Park Acres Development Committee
East Orange General Plan	August 1975	East Orange Development Committee
Santa Ana River/ Santiago Creek Greenbelt Implementation Plan	Sept.9, 1976	Santa Ana River/ Santiago Creek Greenbelt Commission
Santiago Creek Vision Plan	Pending	City of Orange U.S. National Park Service Rivers, Trails, and Conservation Assistance)

"We saw the water wherever we were allowed by the many trees, wild grapevine, rose bushes, tule rush and other plants. The water seems to come down from the mountains to the northeast in which direction a great deal of sycamores, willows, and live oaks are seen running along. We christened this grand, fine and lovely spot for Santiago Apostol (St. James, patron saint of the two Spains.)"

From the diary of Father Juan Crespi describing the campsite of the 1769
Portola expedition on Santiago Creek.

1.0 The Vision

The City of Orange has within its boundaries a valuable and largely under used natural asset, Santiago Creek. The Creek is Orange County's largest watershed and a major tributary of the Santa Ana River. It is a natural waterway over much of its length, a rarity in Southern California urban areas. It has the potential to provide a unique scenic and recreational greenway corridor within the cities of Orange and Santa Ana. A greenway with largely native trees and shrubs would provide some of the natural beauty and wildlife habitat seen in the upper reaches of the creek within the Cleveland National Forest. A system of bike and recreation trails within the greenway would connect the Santa Ana River National Recreation Trail (NRT) on the west to County-owned Santiago Oaks and Irvine Regional Parks in northeast Orange. It would link five city parks within the two cities and would provide off-road access to the existing trails in Anaheim Hills. The goal of this Vision Plan is to realize the recreational and scenic potential of Santiago Creek and its ultimate value to the Cities of Orange and Santa Ana.

The plan is the result of a partnership initiated in 1999 between the City of Orange and the National Park Service (NPS). Since that time the City and the NPS have been working with community residents and state agencies to define this plan for the creek's future. The primary objectives of the plan are to:

1. Construct a multi-purpose trail system along the creek bank connecting The Santa Ana River National Recreation Trail in Santa Ana to Santiago Oaks Regional Park in northeast Orange.
2. Create a greenway (where possible) along the creek by restoring the creek bed and its adjacent uplands with native trees and shrubs.
3. Restore the Creek's natural contribution to groundwater recharge by removal of concrete parking lots from the creek bed and replacing non-native plants with soft-stemmed natives.

4. Maintain or improve flood protection goals defined by county officials and the U.S. Army Corps of Engineers.

As was described in the forward to this document, the idea for a trail and greenway along the creek was initially proposed through local planning documents in the 1950s and 1960s. Along with these studies and plans, some progress has also been made in its actual implementation. For example, by 2008, a Class I bikeway (paved off-road bike path) existed from the west side of the 5 Freeway in Santa Ana to Tustin Street in Orange. By 2016 (as this document is being prepared for publication) The Class I bikeway has been extended east to the Cannon Street Bridge over Santiago Creek. We now have approximately 6.5 miles of Class I bikeway. The bike path is well used by bikers, runners and hikers as can be seen in Figure 1, a photo taken on a Saturday afternoon just east of Cambridge St. However we are short of our goal of connecting to the Santa Ana River Regional Trail in the west by approximately 1.5 miles and short of Santiago Creek Regional Park in the east by about the same distance.

Some segments of the greenway also exist, most notably in Santiago Park in Santa Ana and a segment just east of Hart Park in Orange which was planted with native trees and shrubs in 2002. Santiago Park, in particular the area east of the Santiago Avenue Bridge, provides an example of what the Santiago Creek Greenway could look like over much of its length. The photograph in Figure 2 is a view looking east from the Santiago Avenue Bridge after one of the rains in March of 2005. The sycamores and oaks in the photo are typical southern California native riparian species. The existing bike path runs through the greenway on the north side of the creek and a footpath runs along the south side. In addition to the existing Greenway segments, there are other scenic areas along the creek that with moderate efforts can become elements of the greenway. However there are also areas that will be a serious challenge.



Figure 1 East of Cambridge Street, Saturday Afternoon



Figure 2. Greenway East of Santiago Ave. Bridge in Santiago Park



Figure 3. East of Tustin Street in 2008, bike path stopped by locked gate

Figure 3 is a photo of what was in 2008 one of the most dismal looking areas along the creek. The view is looking east along the future trail route from a point just east of Tustin Street. The bike path route was blocked by a locked gate with a prominent keep-out sign. The route was crowded on its south side by an apartment complex and 200 yards east of the gate there was an unpermitted concrete parking lot in the creek bed. Just past the apartment complex there was a barren stretch of land south of the trail route. When the bike path construction was completed in 2012, the locked gate and the parking lot in the creek were both gone and the barren stretch east of the apartments was planted with approximately twenty five native trees

Returning to the more attractive areas, Figure 4 is a view of the creek in an area behind the Chapman Medical Complex. The trees in the photo are mostly native riparian species. The area is



Figure 4. Creek and Native Trees at the Yorba Site

significant because it is believed to be close to the campsite of the 1769 Portola expedition. Father Juan Crespi who was a priest on the expedition included a good description of the creek and its plant species in his diary. In naming the creek he said: "We christened this grand fine and lovely spot with the name Santiago Apostol," (Saint James the Apostle Patron Saint of the Two Spains). His complete description of the site is given in Section 4.5 of this document.

Figure 5 is a photo of one of the most scenic areas on the creek, the Santiago Creek "rapids." The "rapids" are adjacent to the Hurwitz site west of Cannon Street. The Hurwitz site is a 14.4 acre tract of privately owned land north of Santiago Canyon Road and west of Cannon Street. See sections 2.6 and 4.2 for more detail. The photo was taken from the north side of the creek looking at the desired bike path route along the



Figure 5. "The Rapids" of Santiago Creek

south side. The bike route could proceed east under the Cannon Street Bridge which can be seen at the upper left of the photo.

Figure 6 (next page) is a view looking south from the Santiago Creek Trail near the east end of the Milan Capital site. The Milan Capital site is a 108 acre tract of privately owned land north of Santiago Canyon Road and east of Cannon Street. See sections 2.7 and 4.2 for more detail. The entrance to Santiago Oaks Regional Park is only a half mile further east. The trees in the photo include several native riparian species found within the park.

Figure 7 is a view of one of the trails within the wooded area of the park showing some of the (mostly) native trees and shrubbery.



Figure 6. Santiago Creek Trail, West of Santiago Oaks Park

Figure 8 is a view looking northeast from a high point in the Barham Ranch area of the park. The trail in the foreground connects to the Anaheim Hills Trail over the rise seen in the distance. A trail to Irvine Regional Park branches off to the right of the photo.

Inside Santiago Oaks Regional Park the Santiago Creek Trail connects to the many trails within the park and to the trails in the Anaheim Hills north and east of the park and also connects to regional trails further east and south (e.g., Irvine Regional Park, the Mountains-to-Sea National Recreation Trail and Peters Canyon Trail).

Figure 9 (on page 4) is a map of the envisioned Santiago Creek Trail system and greenway from the Santa Ana River Regional Bike Path to Santiago Oaks Regional Park (and beyond). The trail alignment shown in the map connects three city parks: William O. Hart Memorial Park (Hart Park), Yorba Park and Grijalva Park, as well as the many scenic areas shown in the preceding Figures. The trail alignment links the YMCA and Grijalva Gymnasium, as well as Santiago Park (City of Santa Ana). The trail also comes quite close to one of the largest open space areas in the city, the El Modena Open Space.



Figure 7. Trail in Santiago Oaks Regional Park

Wherever possible the trail alignment includes additional recreation trail segments (generally located on the opposite creek bank from the bike path) and additional greenway segments.

The Class 1 Bike Trail as it exists in 2016 still ends at the 5 Freeway in Santa Ana and at Cannon Street in North East Orange. Extending the bikeway to the Santa Ana River Trail in west and to Santiago Oaks in the east are the primary remaining tasks to complete the Santiago Bike Path.

The trail system described here and in more detail in the next section will provide the City of Orange with a valuable recreational asset, both in the trails themselves and in the access it provides to the existing trails in Anaheim Hills and the Santa Ana Mountains. In addition, the greenway connecting the creek's parks and existing scenic areas will make the path a valuable scenic asset.



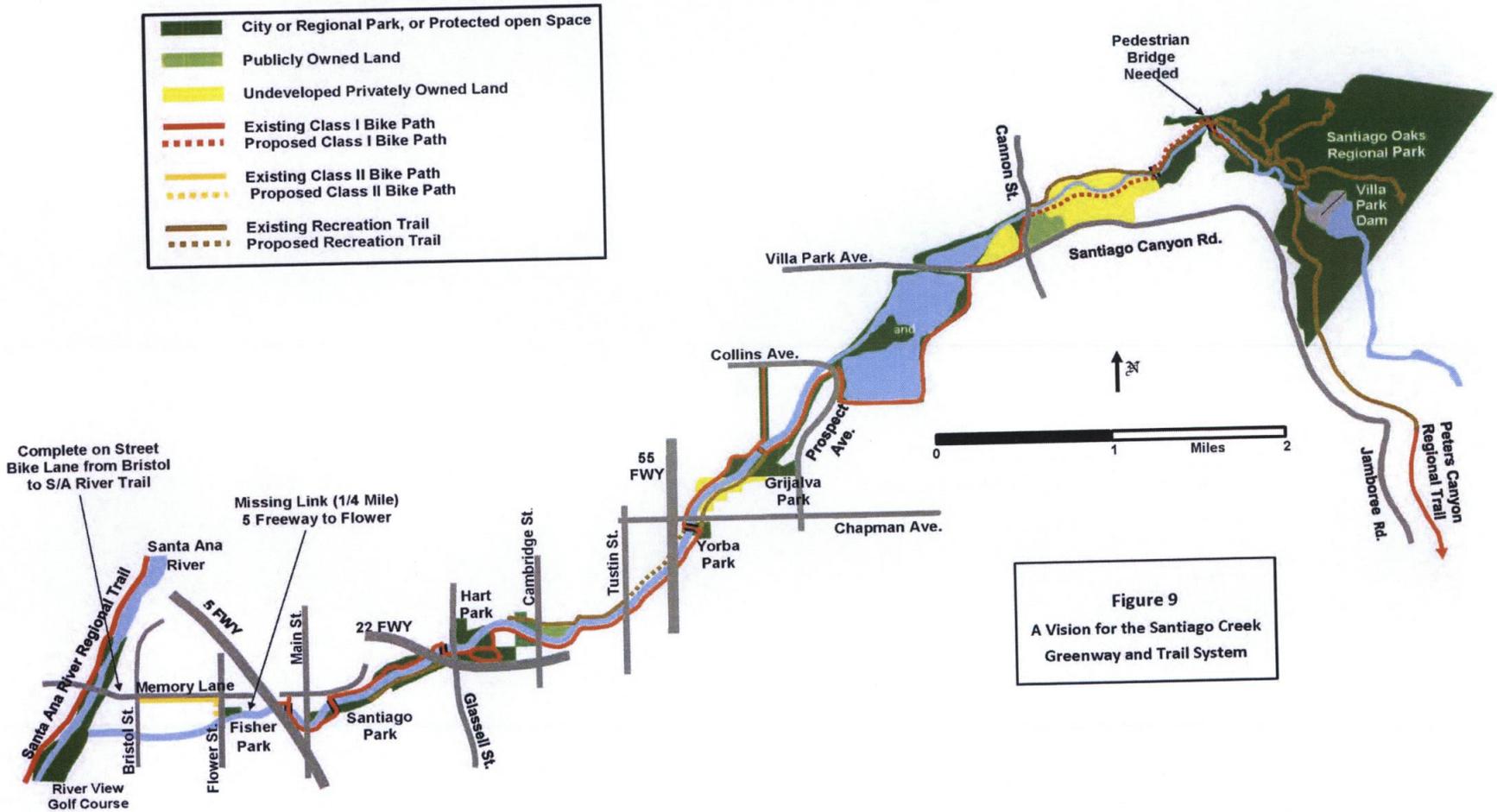
Figure 8. View near top of Barham Ranch photo by Theresa Sears

As shown on the map in Figure 9 (page 4), just West of Hart Park Santiago Creek passes under the 22 Freeway and into the City of Santa Ana. Extending the Bike Path to the Santa Ana River will therefore be under the jurisdiction of the City of Santa Ana. Santa Ana is now in the process of updating their General Plan and with the encouragement of the SCGA and fellow organizations in Santa Ana they have added the Santiago Creek/Santa Ana River Trail connection to the Circulation Element of their General Plan.

The primary issue in extending the creek trail from the 5 Freeway to the Santa Ana River is the trail route. Continuing the Class 1 Trail along the creek bank is by far the safest option. However there is strong opposition to this from the home owners along the creek. A Class II (on street) route is possible but it would subject trail users to heavy rush hour traffic along Main or Broadway Streets and Santa Clara Avenue.

Closing the gap from Cannon Street to Santiago Oaks Regional Park will require construction of Class 1 Bike Path across the old Sully Miller Property (now owned by Milan Capital, a real estate investment company). Milan Capital is (again) planning a housing development on the property but may be persuaded to provide the space for the trail and greenway in their development or in the best case donate property to the County of Orange.

The Santiago Creek Bike Path and Trails



2.0 The Plan

Section 1.0 of this document describes a vision for a trail and greenway along Santiago Creek extending from the Santa Ana River Regional Bike Trail in The City of Santa Ana to Santiago Oaks Regional Park in The City of Orange. The vision was summarized in the map shown previously in Figure 9. This section describes a Plan for the realization of the major part of that vision which lies within The City of Orange. The Plan is the result of a planning process conducted by the City of Orange Community Services Department, the National Park Service Rivers, Trails, and Conservation Assistance Program, the Santiago Creek Greenway Alliance and other citizens groups.

The plan area includes approximately 894 acres of land that comprise the waterway of Santiago Creek and all adjacent undeveloped properties within the city of Orange. It extends from the southwestern city limit where the creek passes under the Garden Grove Freeway to Santiago Oaks Regional Park in northeast Orange. The study area includes over 700 acres of public lands and over 100 acres of private property (County of Orange Tax Records 2007). The public lands include three city parks: Hart Park, Yorba Park, and Grijalva Park and Santiago Oaks Regional Park.

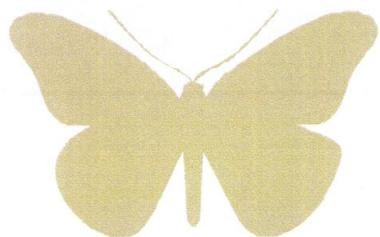
Approximately 100 acres of riparian habitat have been identified for potential in-stream restoration. An additional 300 acres is available for enhancement as oak woodland and riparian forest along the creek banks (i.e. the greenway).

Approximately 75% of the properties identified for potential projects in the Vision Plan are currently owned (as of 2016) by public agencies. The remaining properties are privately owned.

To describe the plan in adequate detail, in this section the creek is divided into eight segments of approximately one mile in length. These segments are discussed in Sections 2.1 through 2.8. Each section contains a map of the trail and greenway, and a narrative description of the segment with photos of significant features and landmarks. The sections also contain a list of potential projects for future consideration. These projects will provide opportunities to achieve the overall goals of the Vision Plan. It is important to note that these project lists do not detail every likely project on Santiago Creek, and the project concepts have not been fully detailed nor analyzed for environmental issues. The project lists provide a starting point for consideration and will be considered and studied further as resources and funding becomes available, or in conjunction with future development proposals

The bike path and recreation trail segments described in this plan have been and will be constructed to the trail standards described in the City of Orange Recreational Trails Master Plan (1993) and the City of Orange Bikeways Master Plan.





Section 2.1. Mile 1 Santa Ana/Orange City Limit to Cambridge Street

The primary landmark in Mile 1 is William O. Hart Park which is located on Santiago Creek between Glassell and Cambridge Streets. A photo of the park, viewed east of Glassell Street, is shown in Figure 10.



Figure 10. Hart Park, the Primary Mile 1 Landmark

The park was constructed on the north side of the creek by the Work Projects Administration (WPA) in the 1930s (Brigandi 1997). It was later expanded to the south side of the creek.

As automobile ownership grew among the local population the creek bed was adapted as a fair- weather parking lot. The park improvements amount to more than 41 acres which includes several picnic areas, a swimming pool, band shell, tennis courts, football field, baseball and softball fields, and a large area of passive park land. The 41 acres also include the National Guard Army and a strip of Caltrans land. There is an existing bike

path which runs between the baseball and softball fields and past the passive park area south of the creek.

The bike path in Hart Park and adjacent open space areas was constructed over the three years from 2003 through 2006. It connected another recently completed bike path from Santiago Park in Santa Ana to an existing path east of Cambridge Street in Orange, providing over two miles of continuous Class I bikeway. The bikeway planning and construction was largely funded by a Transportation Enhancement Grant. Views of the existing bike path in Mile 1 are shown in Figures 11 and 12. Figure 11 shows a segment of the path within the developed park and Figure 12 is a view of the path in the open space east of the park.



Figure 11. Hart Park Bike Path runs along a paved walkway between baseball and softball fields



Figure 12. Bike Path segment from Hart Park to Cambridge Street, completed in 2003



Mile 1. Potential Projects

Seven potential projects for Mile 1 which would achieve the overall vision for this area are listed in Table 1 and shown on the Mile 1 project map in Figure 13. Two of the projects, numbers 1.3 and 1.5 have been recently completed. Of the remaining five, three are restoration projects that would provide for the removal of non- native plants and their replacement with native species. Two projects (1.4 and 1.5) will provide improved groundwater recharge in the creek bed.

A recently completed component of the Hart Park bike path is the pedestrian bridge over the creek, just west of Glassell Street, and a short segment of trail connecting the south end of the bridge to an existing path in the park. Planning and construction of the bridge and bike path segment were funded by Transportation Enhancement and Land and Water Conservation Fund grants with matching funds from Measure M and the City of Orange. This is Project 1.3 in Table 1. Figure 14 shows a photograph of the pedestrian bridge taken from the Glassell Street Bridge over the creek.

Project 1.4 would study options to promote ground water recharge in the area of Hart Park. Project 1.5 had the same objective for the creek bed immediately east of the park. It provided for some re-grading of the creek bed and the removal of concrete debris to improve recharge capacity in that area. Project 1.5 is part of the Orange County Water District's (OCWD) Santiago Creek Recharge Enhancement Project, which is currently in progress (Woodside 2005). The OCWD project also included creek bed re-grading and debris removal in portions of Mile 2 and Mile 3.

Project No.	Location	Description	Goal	Property Owner*	Status
1.1	Creek area under the 22 Fwy. bridge	Assess improvements to discourage loitering and camping	2	CalTrans	Future Project
1.2	Creek bed and upland between the 22 Fwy. and Glassell St.	Remove non-native plants Restore upland and creek bed with natives	2	City of Orange	Future Project
1.3	Hart Park and upland west of Glassell St.	Install pedestrian bridge and realign bike path through Hart Park	1	City of Orange	Complete
1.4	Parking lot in Hart Park	Study options to facilitate groundwater recharge in the area of Hart Park.	3	City of Orange	Future Project
1.5	Creek bed east of Hart Park	Create water percolation area to facilitate groundwater recharge	3	City of Orange	Complete
1.6	Upland area south of the creek just west of Cambridge St.	Restore upland with native plants	2	City of Orange	Ongoing
1.7	Upland area north of the creek west of Cambridge St.	Restore upland with native plants Remove construction fill and debris Place grate over large drainage culvert that is used for loitering, graffiti and vagrancy	2	City of Orange	Ongoing



Figure 14. Pedestrian Bridge West of Glassell, completed June 2006



Legend

Amenities

- Access Point 
- Parking 
- Restrooms 
- Undercrossing 
- Points of Interest 

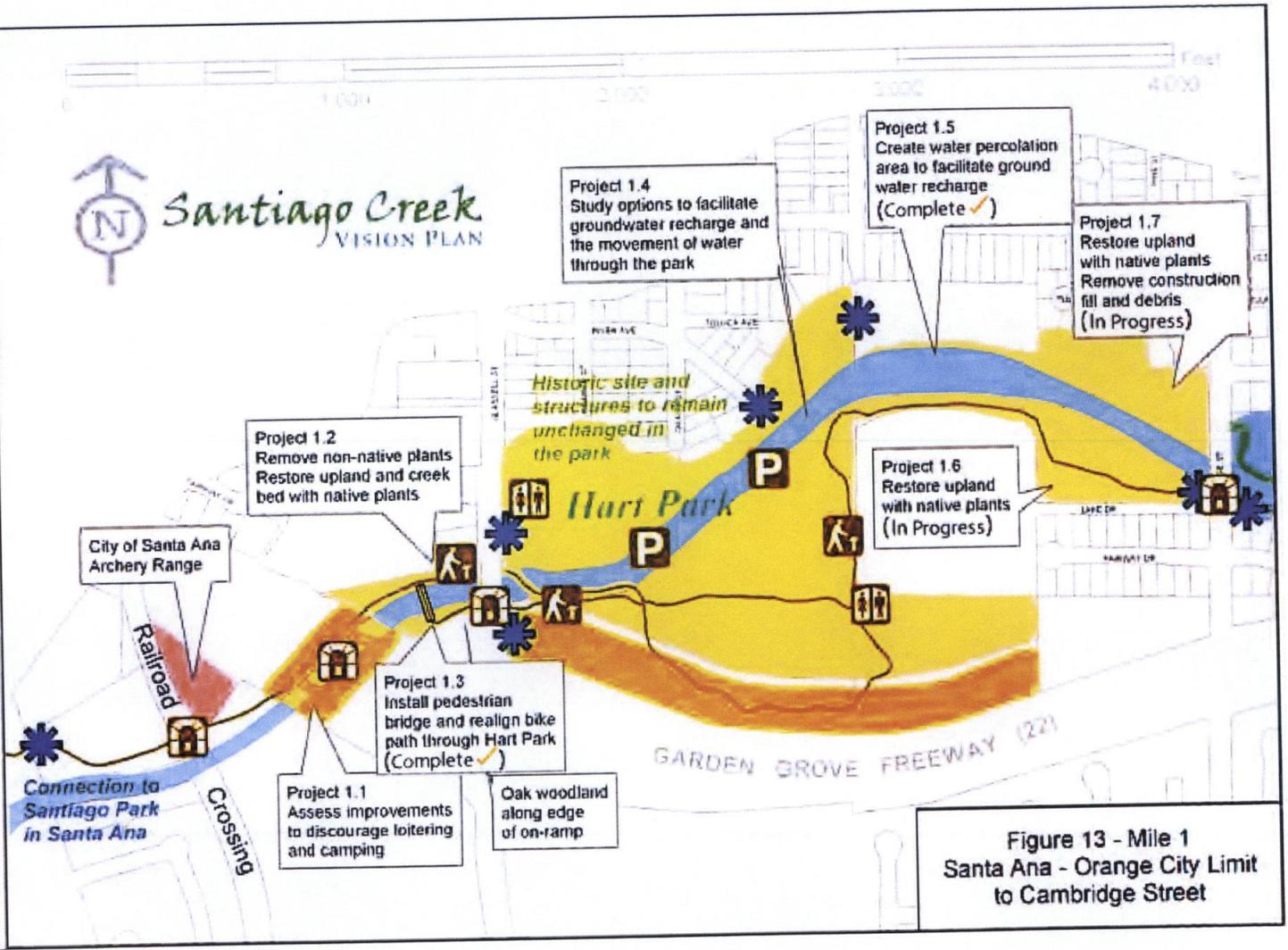
Trails

- Alternate Alignment 
- Existing (E) Class I 
- Proposed (P) Class I 
- Recreation Trail (E) 
- Recreation Trail (P) 

Floodway

Landowners

- City of Orange 
- OC FCD 
- Caltrans 
- City of Santa Ana 



**Figure 13 - Mile 1
Santa Ana - Orange City Limit
to Cambridge Street**

Project 1.6 is one of the two ongoing Mile 1 projects. It provides planning and restoration of the upland south of the creek between Hart Park and Cambridge Street. Figure 15 is a photograph of the area showing some of the native trees and shrubs planted in 2002 and 2003. The project was supported with funding by the California Department of Water Resources Urban Streams Restoration Program obtained by the City of Orange and the Santiago Creek Greenway Alliance in 2001. Planting and care is being accomplished by volunteer labor. Construction of the bike path through this area was funded by a Transportation Enhancement Act grant awarded by Orange County Transportation Authority and Caltrans.

Across the creek, to the north of the Project 1.6 restoration site, is a 4 acre plot of open space identified as Project 1.7 (Figure 16). The site is owned by the City of Orange and is undeveloped park space. It is a candidate for restoration with native plants and an addition to the greenway. Several native trees were planted here in 2005 with residual funding from the Urban Streams Restoration Grant. Further planting was accomplished in 2006 with funds provided by the Santiago Creek Greenway Alliance. Care of the plants is being provided by volunteer labor.



Figure 15. Restoration site between Hart Park & Cambridge Street



Figure 16. Existing Footpath & Candidate for the Greenway Located North of the Creek at Cambridge Street.



**Section 2.2. Mile 2
Cambridge Street to 55 Freeway**

The primary landmarks in Mile 2 are the existing bike path between Cambridge and Tustin Streets and the barren creek bed between Tustin Street and the 55 Freeway.

The Cambridge to Tustin bike path was built in 1997 as a condition to the city's approval of the Sycamore Crossing planned community. The bike path (shown in Figure 17) is located on the south side of the creek and there are soft surface foot paths on both sides. The trails are owned by the city and open to the public. The landscaping is maintained by assessment district fees paid by the Sycamore Crossing Homeowner's Association.

The bike and foot paths between Cambridge and Tustin Streets were professionally landscaped over the length of the development project. The plants are not all native but the landscaping demonstrates successful implementation of a greenway project which will come to be appreciated as the trees grow and mature.

North of the creek and immediately east of Cambridge Street there are two undeveloped publicly owned parcels of land (approximately 2.3 acres each) which could be restored with native trees and shrubs. A photo of this area is shown in Figure 18.

Prior to 2008 the existing bike path came to a stop at a locked gate just east of Tustin Street. A photo of the gate was shown previously in Figure 3.



Figure 17. The existing landscaped bike path between Cambridge St & Tustin St.

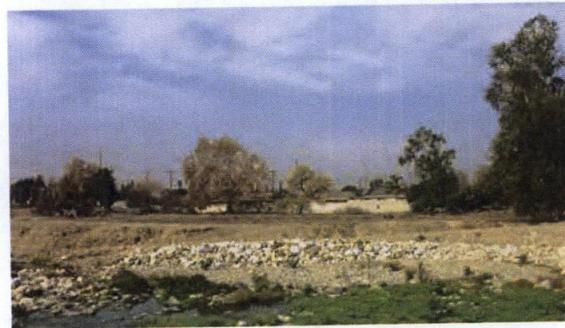


Figure 18. Public Property in Mile 2, potential greenway addition.

By 2012 with the completion of the two construction projects which extended the bike path to Cannon Street, the locked gate was gone as was an unpermitted parking lot in the creek. The desolate upland east of the La Veta Apartment Complex was also planted with native trees. A photo of the creek bed after the removal of the parking lot is shown in Figure 19.

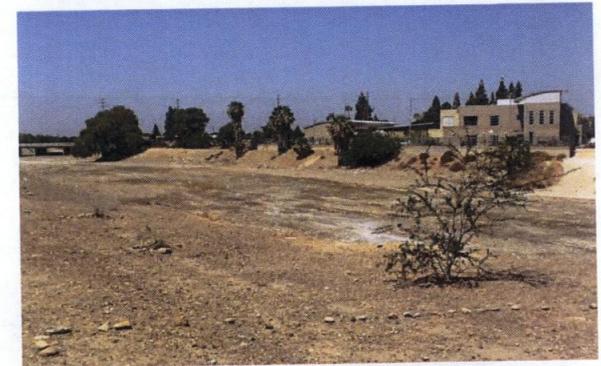


Figure 19. Creek Bed with parking lot removed between Cambridge Street and the 55 Freeway

Mile 2. Potential Projects

Projects proposed within Mile 2 are listed in Table 2 and the Mile 2 project map in Figure 20.

Project 2.1 and 2.2 are restoration projects on the parcels of publicly owned land located between Cambridge Street and the Sycamore Crossing housing development. This is the area shown previously in Figure 18. Project 2.1 provides for the planting of soft stemmed native plants in the creek bed and Project 2.2 provides for the restoration of the creek uplands in the same area with native trees and shrubs.

Construction of the Sycamore Crossing housing development included paving of the creek bed adjacent to the houses (City of Orange 1995). The creek was lined with 'soilcrete,' a soil/cement mixture which gives the paving a natural look similar to that of our local sandstone. The paving however prevents natural ground water recharge by creek flow just as concrete would. Project 2.3 will remove the soilcrete from the center of the creek bed, allowing ground water recharge in this area.



Project No.	Location	Description	Goal	Property Owner*	Status
2.1	Creek bed immediately east of Cambridge St.	Restore creek bed with soft stemmed natives.	2	City and County of Orange	Future project
2.2	Upland north of the creek immediately east of Cambridge St.	Restore upland with native plants.	2	City and County of Orange	Future project
2.3	Creek bed west of Tustin St.	Remove Soilcrete swale and restore groundwater recharge.	3	City of Orange	Future project
2.4	Creek upland between Tustin St. and Walnut Ave.	Construct Class I bikeway from Tustin St. to Walnut Ave.	1	Multiple	Complete
2.5	Upland east of Tustin St. and north of creek	Restore upland edges with native plants.	2	County of Orange	Future project
2.6	Upland south of creek adjacent to Arroyo Casa Apartments	Remove unpermitted encroachments from public property.	1	County of Orange	Complete
2.7	Creek bed adjacent to Orange County Health Care Agency facility	Remove concrete surface from the creek.	3	County of Orange	Complete
2.8	Upland south of creek between Arroyo Casa Apts. and 55 Fwy.	Restore uplands with native plants	2	County of Orange	Ongoing
2.9	Upland north of creek and west of the 55 Fwy.	Restore upland with native plants.	2	Chatham Health LLC	Future project

Project 2.4 is the recently completed extension of the bike path from Tustin Street to Collins Avenue east of the 55 Freeway. An under-pass running beneath the 55 Freeway (shown in Figure 21) provided passage for the bike path beyond that point. As described in the following section (Mile 3), east of the 55 Freeway, the bike path will run along the creek to Grijalva Park where it splits into two branches, one running north along the old railroad right of way to Collins Avenue and the other connecting with an existing bike path which continues northeast along the creek to the Collins- Prospect crossing of Santiago Creek. In early 2008, the Orange City Council approved a plan to implement this project, identified as the Santiago Creek Bike Trail Project -Tustin to Collins (City of Orange 2007).

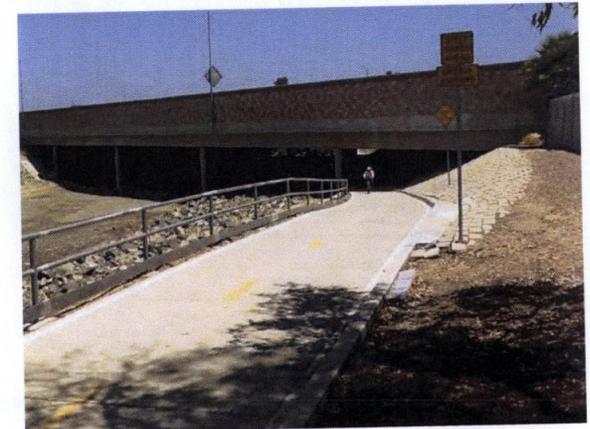


Figure 21. Existing Underpass at 55 Freeway

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Legend

Amenities

- Access Point
- Underpass
- Points of Interest

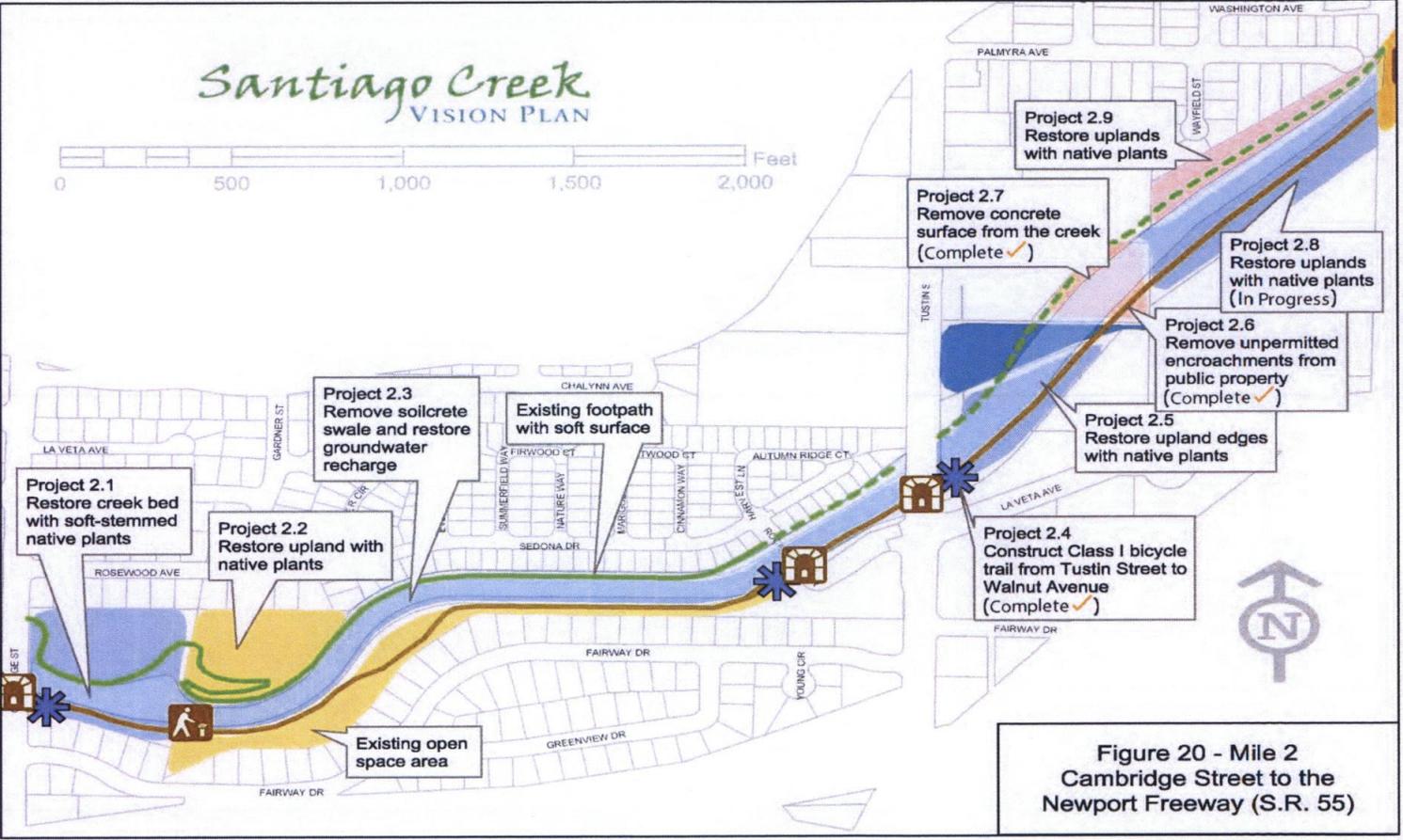
Trails

- Existing Class I
- Proposed Class I
- Recreation Trail (E)
- Recreation Trail (P)

Floodway

Landowners

- City of Orange
- OC Health
- OC FCD
- MWD SC
- Caltrans
- Chatham Health



**Figure 20 - Mile 2
Cambridge Street to the
Newport Freeway (S.R. 55)**

Project 2.5 provides for the restoration of the narrow uplands north of the creek and just east of Tustin Street with native plants. Project 2.6 provided removal of the parking lot adjacent to the Arroyo Casa Apartments, thus clearing the route of the planned bike path through Mile 2. Project 2.7 removed the concrete parking lot in the creek bed enhancing groundwater recharge.

Just upstream of the Arroyo Casa apartment complex, the upland areas adjacent to the creek are wide, affording room for a modest greenway along the bike path (as seen in Figure 22A and 22B). This property is owned by the OCFCD and presents an opportunity for restoration. This is identified as Project 2.8 on the Mile 2 map. The north side of the creek is owned by a nearby acute care facility. It is a narrow strip of land that cannot be easily developed, with a potential to be integrated into the future greenway. Acquisition and restoration is proposed as Project 2.9.

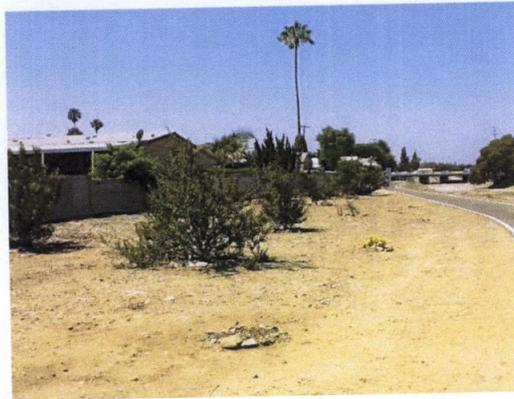


Figure 22A. Ongoing restoration in Mile 2.



Figure 22B. Additional restoration in Mile 2.

Section 2.3. Mile 3
55 Freeway to Walnut Avenue

Primary landmarks in Mile 3 include the YMCA facility and Yorba Park on the southwest, the Chapman Medical office complex near the center and Grijalva Park on the northeast.

The creek bed in Mile 3 is wide and contains a number of mature native trees, making valuable contributions in ground water recharge (Orange County Water District, 2006). Typical segments of the creek in Mile 3 are shown in Figures 23 and 24.

Mile 3 includes a key parcel of undeveloped privately-owned creekside property identified in Section 4.2 as the Chapman-Santiago Partners Property. It is a former landfill located on the south side of the creek with a smaller piece to the north. In 2001 it was rezoned to Recreation Open Space (RO) and designated Open Space on the city's General Plan Land Use Policy Map. The site presents an opportunity to extend Grijalva Park as it could provide for additional passive park use. The size and shape of this site precludes its use for ball fields. It is recommended that, at a minimum, a 50 foot right-of-way for a recreation trail and greenway should be obtained in the event the land is developed. The goal is to separate the creek from structures such as fences, walls or buildings by creating a landscaped greenway parallel to the trail.

Mile 3 also contains a site of national significance (Brigandi 1997). A plaque in Yorba Park indicates that on the night of July 27, 1769, the Portola Expedition camped on Santiago Creek at a site one-half mile to the north. This would place the encampment on the Chapman-Santiago Partners property near the area shown in Figure 25.



Figure 23. One of the most natural creek Beds in the Urban area



Figure 24. Native Plant species along the creek in Mile 3

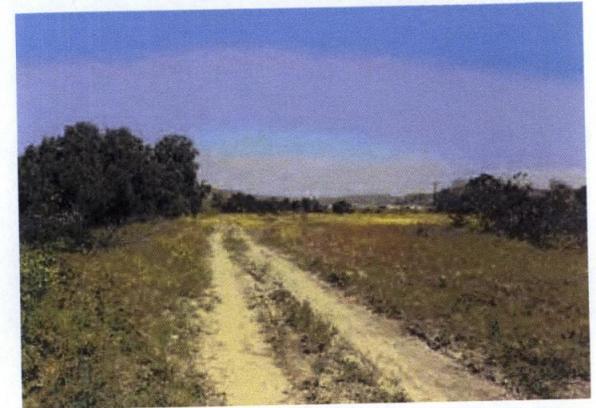


Figure 25. Uplands in Mile 3, one of the largest areas of Undeveloped Creekside Property



Mile 3 Potential Projects

The construction and restoration projects recommended for Mile 3 are shown in Table 3 and the Mile 3 map in Figure 26. There are seven potential projects that provide restoration in and along the creek, creation of three small passive parks, construction of a recreation trail on the east side of the creek and the planned expansion of Grijalva Park.

As indicated on the Mile 3 map, the recently completed bike path enters Mile 3 on the east side of the creek at the 55 Freeway underpass. It then crosses through a portion of the YMCA property and along the western edge of Yorba Park. Project 3.1 provides for the planting of native trees and shrubs on the uplands east of the creek in this area. Yorba Park is located on a former land fill and methane from the buried materials precludes tree planting in its central area. Adjacent to the trail, however, in the area shown in Figure 27, native trees and shrubs have been planted, providing a valuable scenic addition to the greenway.

Just south of Chapman Avenue, the bike path crosses to the west side of the creek over a pedestrian bridge which was installed as part of Project 2.4. The path passes beneath Chapman Avenue and proceeds along the creek on property owned by the county. At Walnut Avenue, the trail branches, one segment turning north on an abandoned railroad right-of-way and the other crossing back over the creek to Grijalva Park on a second pedestrian bridge. The publicly-owned right-of-way on the west side of the creek was used for the bike path (Project 2.4), but, as shown in Figure 28 it provided room for only a minimal greenway. Most of the restoration described in Project 3.3 will be accomplished in the creek bed and on the uplands on the east side of the creek.

Project No.	Location	Description	Goal	Property Owner*	Status
3.1	Upland east of the creek from the 55 Fwy. to Chapman Ave.	Restore uplands with native plants	2	YMCA, County and City of Orange	Ongoing
3.2	Upland east of the creek from Chapman Ave. to Grijalva Park	Construct Recreation Trail from Chapman Avenue to Walnut Avenue, connecting Yorba and Grijalva Parks.	1	County and City of Orange, Chapman-Santiago Partners	Future project
3.3	Upland and creek bed from Chapman Ave. to Walnut Ave.	Remove non-native plants and restore with native plants.	2	County and City of Orange	In Progress
3.4	East side of creek between Chapman Medical Complex and Grijalva Park	Potential acquisition for expansion of Grijalva Park, or, Require dedication of trail and greenway right-of-way. Install historical marker denoting campsite of the 1769 Portola Expedition.	1	Chapman-Santiago Partners	Future project
3.5	West side of creek at Palm Ave.	Study area for potential neighborhood park and trail access point.	1	Chapman-Santiago Partners	Future project
3.6	West side of creek opposite Grijalva Park	Acquire and restore property	2	Cal-Fed Partners	Future project
3.7	City property west of Grijalva Park	Expansion of Grijalva Park to include an Aquatic Center, and other facilities.		City of Orange	Active project
3.8	West side of creek at Walnut Ave.	Study area for potential neighborhood park and trail access point.	1	City of Orange	Future project



Figure 27. West side of Yorba Park can provide an addition to the greenway.



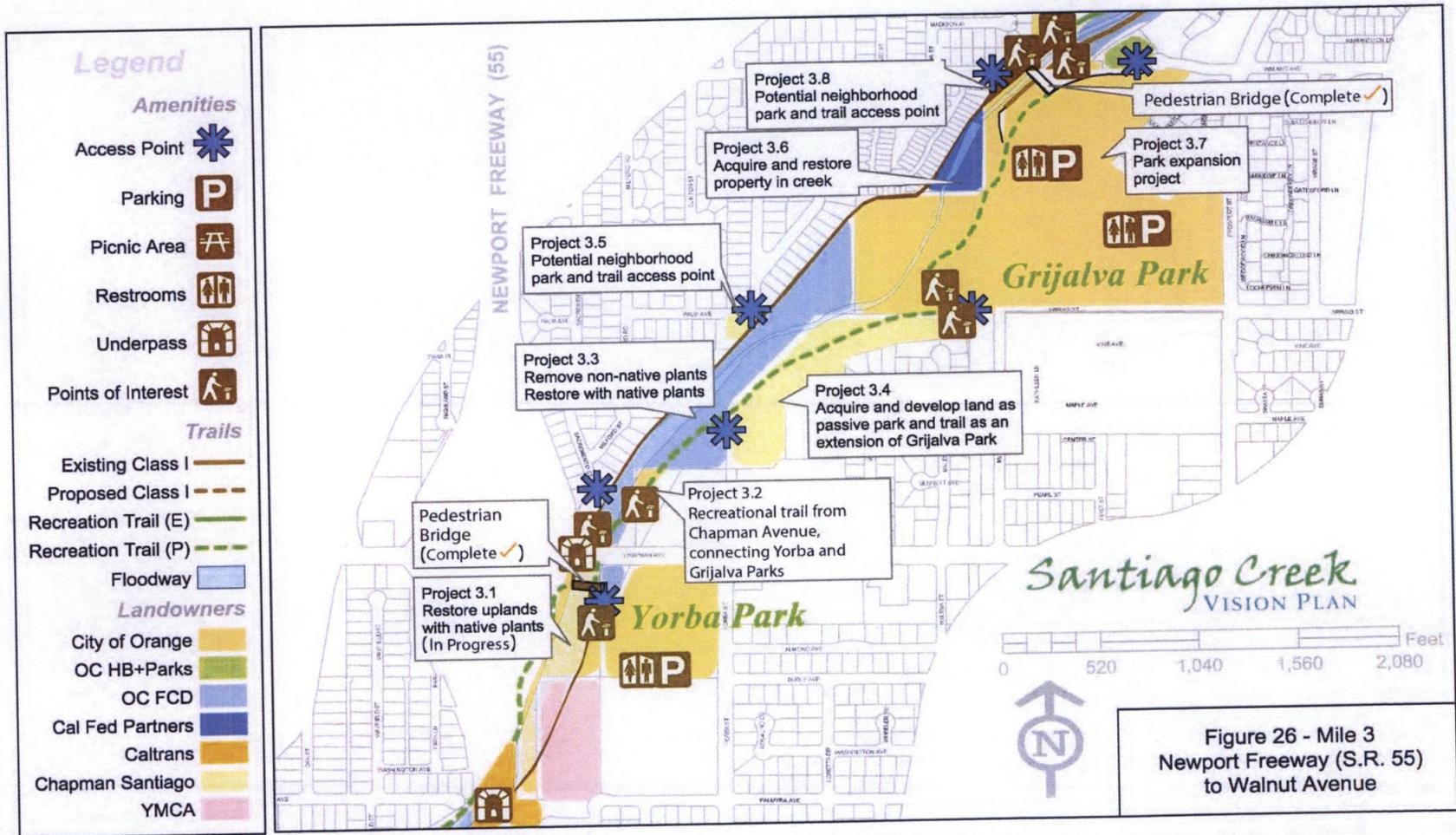


Figure 26 - Mile 3 Newport Freeway (S.R. 55) to Walnut Avenue

The Mile 3 map indicates a recreation trail on the east side of the creek, identified as Project 3.2. This trail branches from the bike path just south of Chapman Avenue, and proceeds north beneath the Chapman Avenue Bridge and then northeast along the creek to Grijalva Park. The portion of this trail that is located north of Spring Avenue is included in the planned expansion of Grijalva Park (City of Orange 2006). The portion between Chapman Avenue and Spring Street crosses small segments of property owned by the state, the county and Chapman-Santiago Partners. Project 3.4 includes acquisition of the site by fee or easement for development as a passive park, or in the alternative, dedication of the recreation trail and greenway right-of-way.

The sites identified as Projects 3.5 and 3.8 could be developed as small neighborhood parks providing local access to the Santiago Creek bike path from west side residential neighborhoods.

Project 3.7 is the planned expansion of Grijalva Park on the city owned land just west of the existing park. The park Master Plan includes a gymnasium, aquatic center, community building, nature trail and other facilities. It will also provide linkage of the recreation trail (Project 3.2) to the existing bike path segment north of Grijalva Park.



Figure 28. West side, good bike route but minimal room for Greenway.

Section 2.4. Mile 4 Walnut Avenue to the Prospect-Collins Curve

The landmarks in Mile 4 include a concrete spillway and channel below the Orange County Water District Recharge Basin, an existing Class I bikeway segment on the east side of the creek and a landscaped buffer between the bike path and the Rock Creek Ranch housing development. A small public access trailhead is also located here at Walnut Avenue. These improvements exist as the result of a negotiated agreement between the developer of Rock Creek Ranch, the U.S. Army Corps of Engineers, OCFCD and the City of Orange (City of Orange 1989). West of the creek are three small parcels of land that provide opportunities for tree planting and landscaping. An existing maintenance road could be used as an unimproved recreation trail.

Within Mile 4 the creek is hemmed in by adjacent developments that limit open space and public access. The west side of the bike path is bordered by a protective chain link fence at the steep slope of the concrete channel (a situation that should be avoided in the future). If funding were to become available in the future, it would be preferable to replace the chain link fence with a more decorative option. A photo of the trail and landscaping is shown in Figure 29.

Figure 30 is a view of the maintenance road on the west side of the creek and a closer view of the concrete channel.



Figure 29. Bike path segment bordered by narrow strip of landscaping and chain link fence

As described in Section 2.3, the bike path on the west side of the creek (Project 2.4) branches at Walnut Avenue, one segment turning north on an abandoned railroad right-of-way and the other crossing back over the creek to Grijalva Park on a second pedestrian bridge. The northbound segment follows the former Southern Pacific railroad right-of-way to Collins Avenue where it connects to an existing Class I bikeway north of Collins and adjacent to Wanda Street.



Figure 30. Maintenance road and view of concrete channel

On the east side of the pedestrian bridge the trail connects to the existing Class I bikeway segment at the Rock Creek Ranch development. This trail continues northeast along the creek to the Prospect-Collins curve. Connection of the Mile 4 bike path to Mile 5 is provided through an undercrossing under Prospect Street.

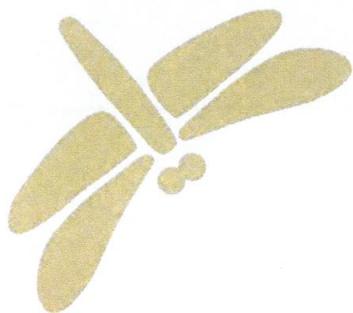
Mile 4 Potential Projects

There are five projects identified for Mile 4, shown on the Project Map in Figure 31 and in Table 4.

Project 4.1 is the creation of a neighborhood park at the site of the Patterson Bowers' orange grove, the first such grove ever planted in the City of Orange. Projects 4.2 and 4.3 are restoration projects proposed on multiple parcels on the west side of the creek. Three of these are privately owned and the others are owned by the City of Orange. As previously described in Section 2.2, Project 4.4 was the construction of a Class 1 Bikeway on the abandoned railroad right-of-way to connect Grijalva Park with the existing bikeway north of Collins. Project 4.5 would remove the center of the concrete channel creating a more natural creek bed and restoration of normal groundwater recharge in this area. While the Mile 4 map identifies use of the existing county service road on the west side of the creek as a recreation trail, this is not identified as a project since the facility is already in place and implementation would simply require elimination of a gate at Collins Ave.

Table 4. Mile 4 Projects

Project No.	Location	Description	Goal	Property Owner*	Status
4.1	West side of creek, north of Walnut Ave.	Build neighborhood park, (former site of first orange grove in Orange)	2	City of Orange	Future project
4.2	Upland along west side of creek northeast of Project 4.1	Acquire property or work with owner to accomplish restoration with native plants	2	Dorothy Cauffman	Future project
4.3	Upland along west side of creek northeast of Project 4.2	Restore woodland with native plants	2	City of Orange	Future project
4.4	Abandoned railroad right-of-way between Walnut and Collins Avenues	Construct Class 1 bike path	1	City of Orange	Complete
4.5	Creek bed from Walnut Ave. to Prospect-Collins curve	Remove concrete lining from center of channel and restore natural creek bed	3	Orange County Flood Control District	Future project



Section 2.5. Mile 5 Prospect-Collins curve to Villa Park Road

The primary landmark in Mile 5 is the Orange County Water District's Recharge Basin north of Bond Avenue. The Basin is a 150-foot deep gravel pit that was purchased and stabilized in the 1990s by the OCWD to retain water from the creek and to receive water pumped from the Santa Ana River through an underground pipeline. Water is held in the basin for percolation into the underground water table (Orange County Water District 2008). The basin is operated partially as a flood protection facility though it generally remains full year round and is a scenic lake. The vertical edges of the basin and loose gravelly soils preclude public access to the water. Clusters of native southern California plant communities thrive along the edges of the reservoir. A view of the basin from the Prospect-Collins curve is shown in Figure 32.

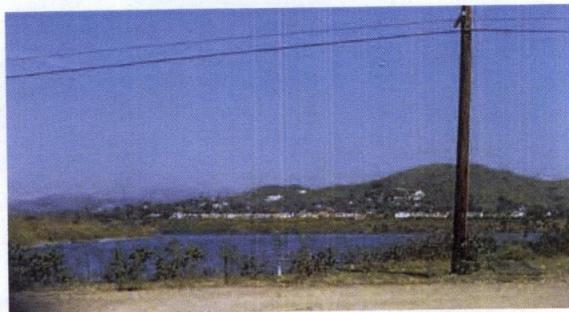


Figure 32. Recharge basin from Prospect-Collins Curve

From the Prospect-Collins curve there are two possible routes for the bike path around the basin. A route along the west side is the most scenic. The eastern route proceeds south along Prospect Street from the Prospect-Collins curve to Bond Avenue, east along Bond Avenue to Hewes Street and then north along OCWD property west of Hewes to Villa Park Road. Public safety and security considerations require that for either route the bike path lie outside the basin's existing perimeter fencing. For the eastern route, this places the path adjacent to the road through most of the Mile 5 segment although it was constructed as a separate Class I bikeway.

The eastern route was implemented due to its ease of construction and its separation from residential property. The western route however should continue to be considered for possible future construction. It would provide a loop trail around the Recharge Basin as well as very scenic views. An example is shown in Figure 33 which is a view looking east across the basin from the potential trail route along the west side.

Although not as scenic as the western route the eastern route still has some very attractive views. An example is shown in Figure 34 which is a view of the east side of the basin from the trail route near the intersection of Hewes Street and Villa Park Road.



Figure 33. Looking east from end of Adams Ranch Road on west side of basin



Figure 34. East side of Basin near intersection of Hewes Street and Villa Park Road

Mile 5 Potential Projects

The projects recommended for Mile 5 are shown in Table 5 and the Project Map in Figure 35. The Table identifies three projects that would provide the underpass at the Prospect-Collins curve and bike path construction around the Recharge Basin.

Project 5.1 is the construction of a safe crossing at the Prospect- Collins curve. A photo of the underpass constructed as part of trail construction project is shown in Figure 36

Table 5. Mile 5 Projects					
Project No.	Location	Description	Goal	Property Owner*	Status
5.1	Prospect-Collins Curve	Construct a safe crossing at Collins-Prospect curve	1	Orange County Water District	Complete
5.2	Bond Ave. from Prospect St. to Hewes St.	Study the feasibility of restriping Bond Avenue to delineate bike path on existing street.	1	City of Orange	Complete
5.3	OCWD Recharge Basin	Construct Class I bike path from the Prospect-Collins Curve to Villa Park Rd.	1	OCWD and City of Orange	Complete
5.4	Near Hewes Villa Park Road Intersection	Construct bird watching platform	2	OCWD	Future Project



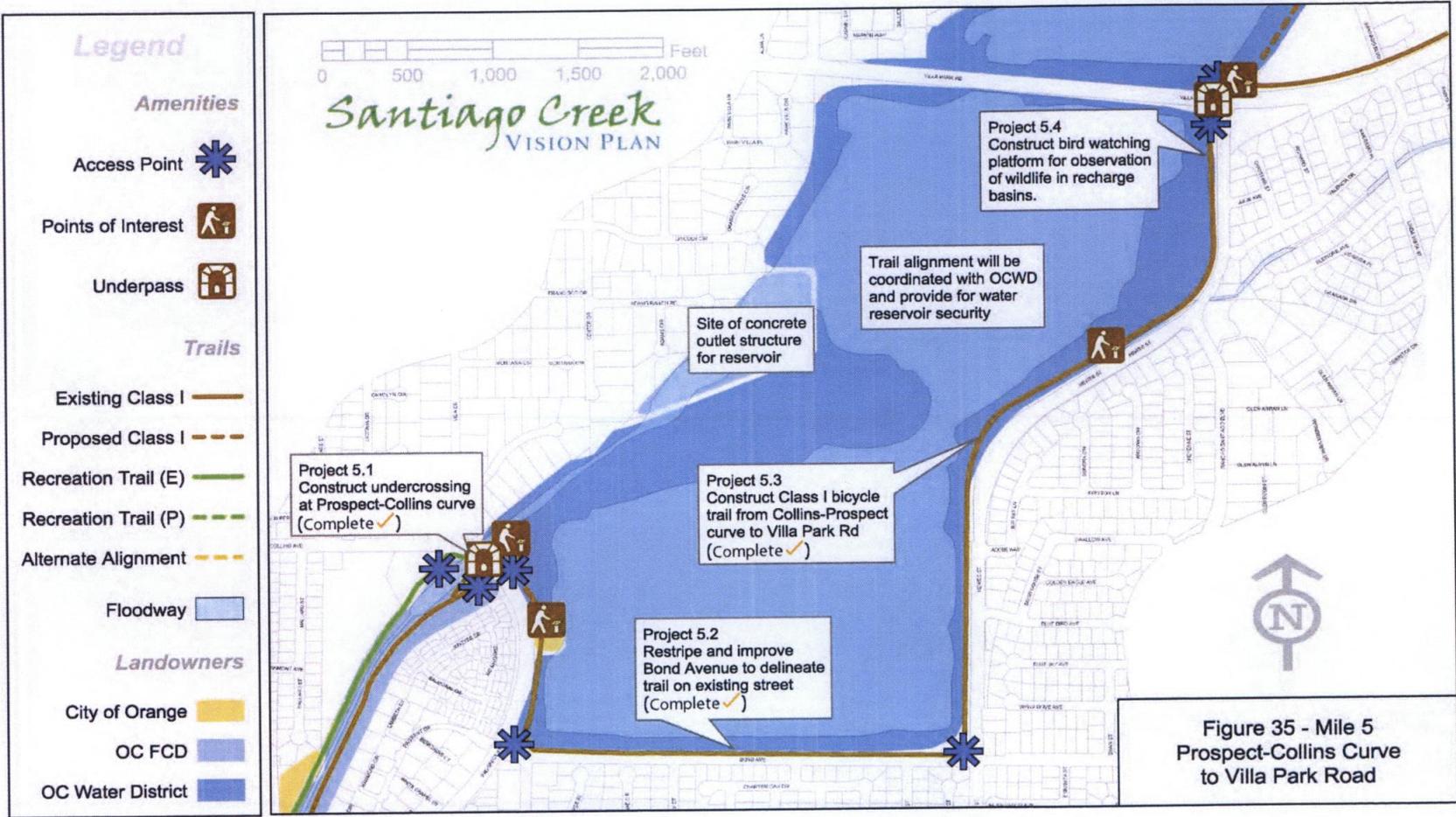
Figure 36. New underpass at Prospect Collins Curve.

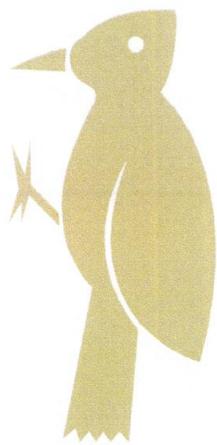
Project 5.2 provides the bike path segment along Bond Avenue. On its south side, the Recharge Basin is separated from Bond Avenue by a block wall and a narrow strip of landscaping. A photo of the area is shown in Figure 37. Bond Avenue is a four lane road and space for the bike path on its north side was provided by re-striping the traffic lanes.



Figure 37. Looking east along Bond Avenue

Project 5.3 provides the bike path segments along the west and east sides of the Recharge Basin. Along the west side, and most of the east side, OCWD's property includes adequate space for the bike path between the street and the basin's existing chain link fence. On the east side just north of Bond Avenue however the fence was moved a short distance west. The non-native oleander bushes were replaced with native trees and shrubs appropriately spaced so as not to obstruct views across the basin.





Section 2.6. Mile 6

Villa Park Road to Cannon Street Bridge

Between Villa Park Road and Cannon Street are some of the most scenic and natural areas found on the creek within the city limits of Orange. The uplands on the south side of the creek provide striking views of the creek, wetlands, the OCWD recharge basin to the southwest, and the open space and foothills to the east.

Property along the creek in Mile 6 is owned primarily by OCWD and the county although there are two parcels of private property. Prior to 1973 the Hurwitz property was the site of an open pit sand and gravel mining operation (County of Orange 1977). The site, which remains privately owned, has not been restored and contains a large open pit which complicates bike path planning. There are two alternate routes considered in Mile 6. The proposed route is along the uplands on the south side of the creek extending directly from the intersection of Villa Park Road and Hewes Street to the Cannon Street Bridge. The completed route runs east from the intersection along Santiago Canyon Road (Villa Park Road) to Cannon Street and then north along public land west of Cannon Street to the Cannon Street Bridge.

Figure 38 is a view of Santiago Creek and adjacent wetlands immediately north of Villa Park Road. The proposed bike path route through here is along the top of the bluff on the far (southeast) side of the creek where there is an existing unpaved road. The wetlands at the base of the bluff include wildlife habitat protected by mutual agreement of OCWD and the U.S. Fish and Wildlife Service. The OCWD recharge basin is visible in the background, to the right.



Figure 38. Bluff south of creek with recharge basin in background

This reach includes one of the most scenic views along the creek. The 'rapids' of Santiago Creek are the result of the high bedrock in the area and a relatively steep drop from Cannon Street to Villa Park Road. After a good winter rain the views from the bluffs overlooking this area are quite impressive. A photo of the rapids taken after one of the rains in March of 2005 is shown in Figure 39. The photo was taken from the north side of the creek at Santiago Boulevard, looking toward the desired trail route on the far side. The Cannon Street Bridge can be seen at the upper left of the photograph.

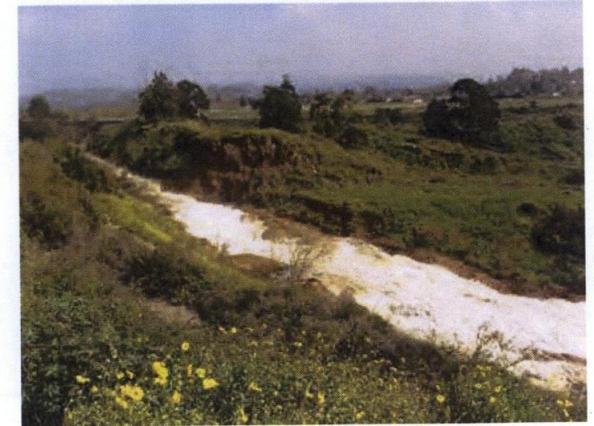


Figure 39. Santiago Creek rapids after a good rain



Mile 6 Potential Projects

The projects recommended for Mile 6 are shown in Table 6 and the project map in Figure 40.

Project 6.1 is a trail crossing near the corner of Villa Park Road and Hewes Street.

Project 6.2 provides for construction of a bike path along the edge of the creek between Villa Park Road and Cannon Street. The preferred alignment along the uplands south of the creek will necessitate public acquisition and regrading of a portion of the Hurwitz property to provide a minimum of 50 feet for construction of a safe trail alignment and associated greenway. An alternate route which avoided the steep terrain at the edge of the unreclaimed Hurwitz gravel pit was selected for construction. It is identified as Project 6.3. The route goes south around the pit and then back north on County property to the Cannon Street bridge.

Project 6.4 suggests the acquisition and reclamation of the Hurwitz pit to permit recreational use, construction of the bike path along the desired route on the south side of the creek, and stabilization of the slopes at the pit edges. Figure 41 is a photo showing a cross-section of the western edge of the pit where it intersects the old road bed for Santiago Boulevard on the south bank of the creek. The steep left-facing slope at the center of the photo is directly in the path of the desired bike path route and would require contour grading prior to bike path construction.

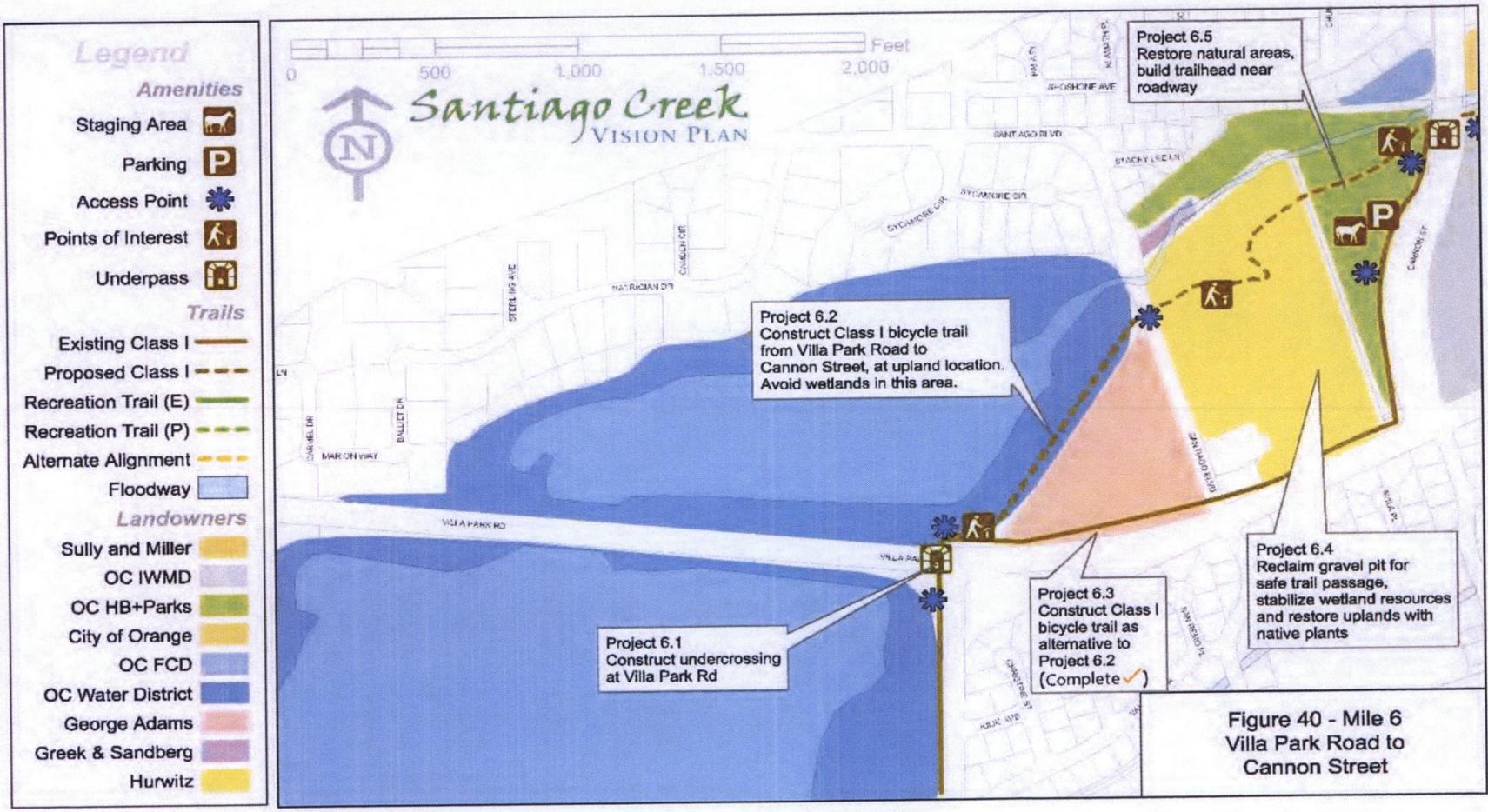
Project No.	Location	Description	Goal	Property Owner*	Status
6.1	Corner of Hewes St. and Villa Park Rd.	Construct safe crossing at the Hewes- Villa Park Rd. intersection	1	City of Orange	Complete
6.2	Upland on south side of creek from Villa Park Rd. to Cannon Street Bridge	Construct Class I bike path from Villa Park Rd. to Cannon St. at upland location.	1	OCWD, County of Orange & Annette Hurwitz	Future project
6.3	Villa Park Rd. and Cannon Street Bridge	Construct Class I bike path as alternate to project 6.2	1	OCWD, County of Orange & Annette Hurwitz	Complete
6.4	Hurwitz property west of Cannon St.	Reclaim gravel pit for safe trail passage and to eliminate unsafe slopes. Stabilize wetlands and restore uplands with native plants	1 2	Annette Hurwitz	Future project
6.5	Uplands on south side of creek from Villa Park Road to Cannon St.	Restore upland with native plants. Build trailhead near roadway.	2	OCWD	Future project

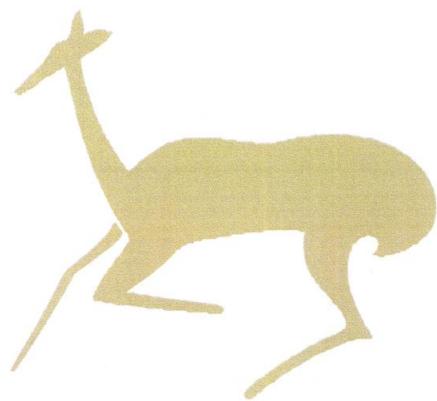


Figure 41. Hurwitz Property to the Left, creek in left foreground

Project 6.5 provides for the construction of a community trailhead and equestrian staging area and restoration of the available open space north of Villa Park Road and west of Cannon Street on property owned by the County of Orange. The facility's perimeter would be planted with native trees and shrubs.







Section 2.7. Mile 7

Cannon St. Bridge to east end of Milan Capital Property

Mile 7 contains the largest undeveloped parcel of land in the study area. It was formerly known as the Sully-Miller properties named for the firm that mined this site between 1920 and 1985. It is one of only four sizeable undeveloped parcels of land remaining along Santiago Creek (the other three are the Yorba site behind Chapman Hospital; the Hurwitz property on the west side of Cannon Street; and the abutting Villa Park Landfill). A small portion of the site is presently being used for a recycling/crushing facility operated by Hanson Aggregates. Agricultural field crops have been grown in the past on large portions of the site that was first mined for sand and gravel, and then filled with silt from processing operations, or with inert materials (rock, asphalt, concrete, etc.).

The Villa Park Landfill was a former gravel pit which was once mined to a depth of about 75 feet (County of Orange 1977). After removal of the sand and gravel it was used for disposal of household refuse. The disposal site is still producing significant amounts of methane gas that is evacuated through a system of underground wells and pipes exhausting to the atmosphere (County of Orange 2000).

In 2007 the Sully-Miller site was acquired by Milan Capital, a real estate management firm. In this document the property is identified by the name of the new owner.

Figure 42 is a photograph of the Milan Capital site looking west from Rattlesnake Peak in Santiago Oaks Park. The Cannon Street Bridge is seen in the background near the upper left. A portion of Mabury Avenue is seen along the right. Santiago Creek, visible only as a riparian corridor, flows generally west past the Villa Park Landfill and under the Cannon Street Bridge. The creek itself is hidden by the trees in the foreground and eclipsed by the terrain.

Much of the Milan Capital property is covered with a mixture of native and non-native plant species, as seen in Figures 42 and 43. The trees shown in the photos are mostly native willows. An existing unpaved road running east from Cannon Street Bridge to the vicinity of Handy Creek (shown in Fig. 43) could provide a good base for the Bike Path.

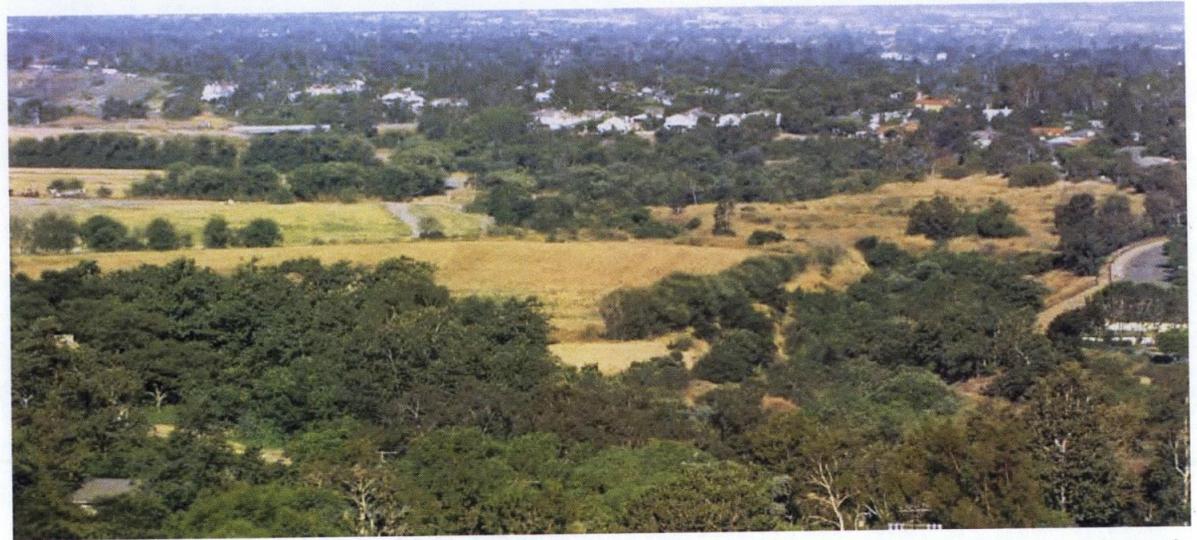


Figure 42. Milan Capital Site, the largest undeveloped property on the Creek.



Figure 43. Existing unpaved road will provide a good base for the bike path.

Mile 7 Potential Projects

The potential projects recommended for Mile 7 are shown in Table 7 and the project map in Figure 44.

Project 7.1 proposes a trail undercrossing under Cannon Street connecting the existing bike path west of Cannon to the trail proposed below as project 7.2.

Project 7.2 provides for construction of the bike path from the Cannon Street Bridge to the entrance to Santiago Oaks Regional Park which would be the terminus of the paved bike path. From Cannon Street the trail continues along the south side of the creek to the eastern end of the Milan Capital property. At that point, a pedestrian bridge to be constructed as project 7.4 provides a crossing to the north side of the creek and the Mabury Ranch Trail. Also at approximately this point the Mabury Ranch Trail change names, becoming the Santiago Creek Trail, a soft surface trail which continues east to the north entrance to Santiago Oaks Regional Park. At the north entrance, a second pedestrian bridge to be constructed as project 8.1 provides access back to the south side of the creek and the park ranger station and other park facilities. Project 8.1 is the only project proposed for Mile 8 and will be briefly discussed below under the Mile 8 projects.

Project 7.3 provides for the removal of non-native species along the creek and trails in Mile 7 and, where needed, replacing them with native species. Figure 45 shows another view of some typical plant growth on the property. The trees in this photograph are mostly native willows and the shrubs are also natives. The restoration proposed for project 7.3 would leave these plants in place.

Figure 46 is a photo looking northeast along the Santiago Creek Trail from a point near the east end of the Milan Capital property. The Park is only one half mile down this trail.

Project No.	Location	Description	Goal	Property Owner*	Status
7.1	County owned land east of Cannon Street and north of Santiago Canyon Road.	Construct underpass under Cannon Street	1	County of Orange	Future project
7.2	Cannon Street bridge to Santiago Oaks Regional Park	Construct Class I bike path from Cannon Street to Santiago Oaks Park	1	County of Orange / Milan Capital	Future project
7.3	Cannon Street bridge east and north to Mabury Ranch Trail	Restore land on both sides of trails with native plants as needed	2	County of Orange / Milan Capital	Future project
7.4	Milan Capital property	Provide pedestrian bridge crossing to Mabury Ranch Trail	1	Milan Capital	Future project

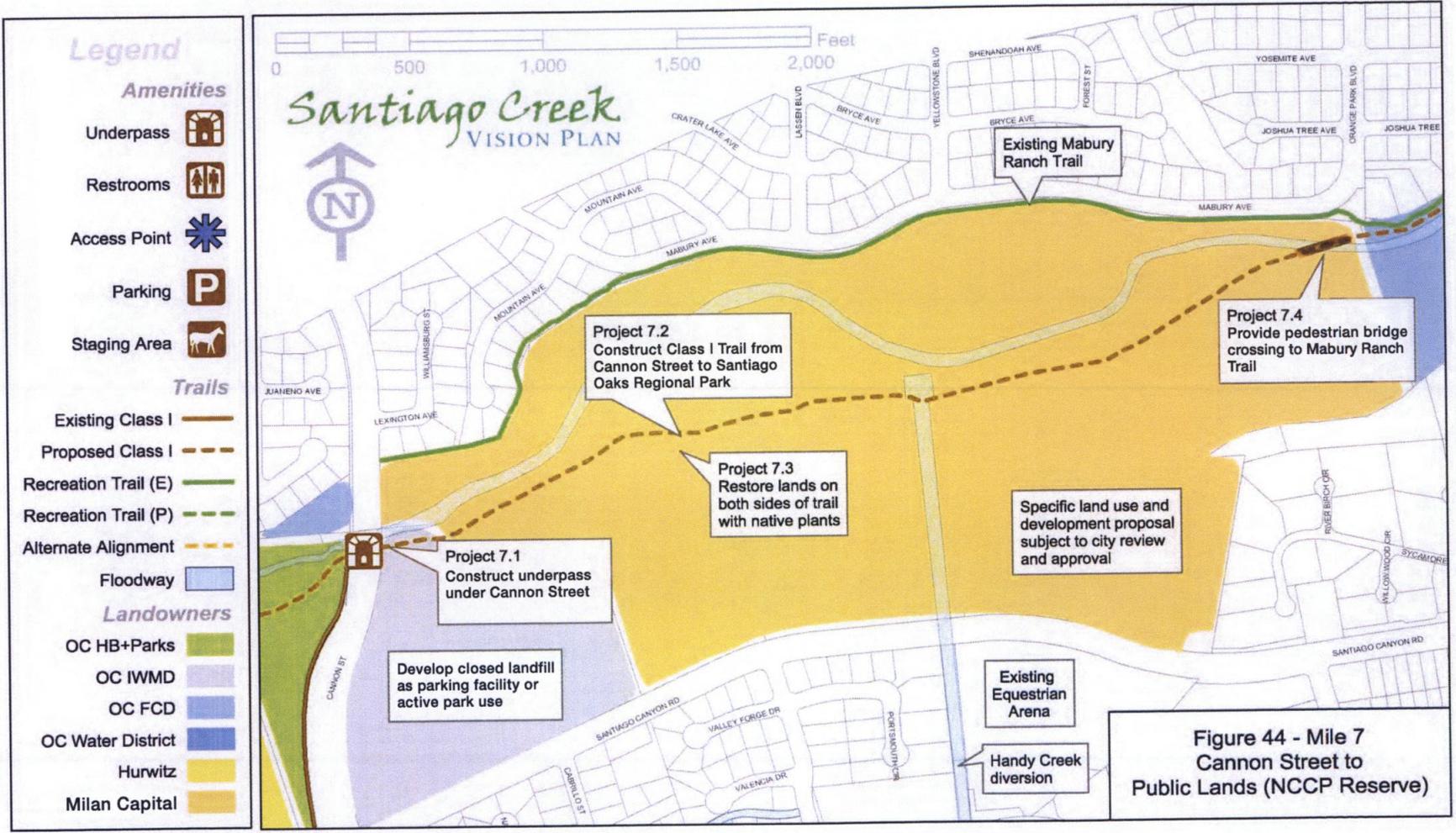
Path.



Figure 45. Typical plant growth along creek on Milan Capital Property.



Figure 46. Looking Northeast towards Santiago Oaks Regional Park along Santiago Creek Trail.



**Figure 44 - Mile 7
Cannon Street to
Public Lands (NCCP Reserve)**

SECTION 2.8. Mile 8

East Sully-Millersite to Santiago Oaks Regional Park

In Mile 8 the existing Santiago Creek Trail continues along the north side of the creek across Orange County Flood Control District (OCFCD) property, entering Santiago Oaks Regional Park. The OCFCD property is densely wooded, making the view to the south of the trail in this area quite scenic. Figure 47 shows a typical view from the trail looking south across the creek.

The Santiago Creek Trail enters the park on the north side of the creek. The entrance (shown in Figure 48) is across the creek from the park's main entrance on Windes Drive.

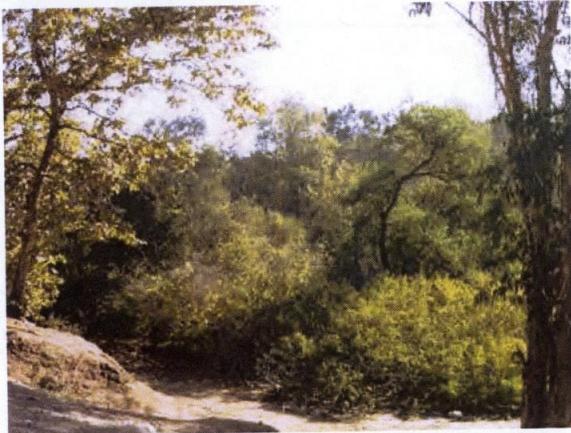


Figure 47. Existing greenway along Santiago creek trail



Figure 48. Trail entrance to Santiago Oaks Regional Park

Mile 8 Potential Projects

The potential project recommended for Mile 8 is shown in Table 8 and the Mile 8 map in Figure 49.

Table 8. Mile 8 Projects					
Project No.	Location	Description	Goal	Property Owner*	Status
8.1	End of public maintenance road at Hidden Creek tract	Install pedestrian bridge to provide a safe crossing from the north to the south sides of the creek	1	Orange County Flood Control District	Future project

*as of Sept. 2007

The only project recommended for Mile 8 is the installation of a pedestrian bridge across the creek, near the park entrance shown in Figure 48. The bridge would provide a safe crossing from the north to the south side of the creek, an easier trail into the park and more direct access to the park's main entrance and existing recreation trails. Figure 50 is a photo of an old concrete dam near the end of the Hidden Creek Trail. It has been used to cross the creek, but it is not suitable for bicyclists and equestrians due to its extremely narrow width and the large boulders on the creek bank.



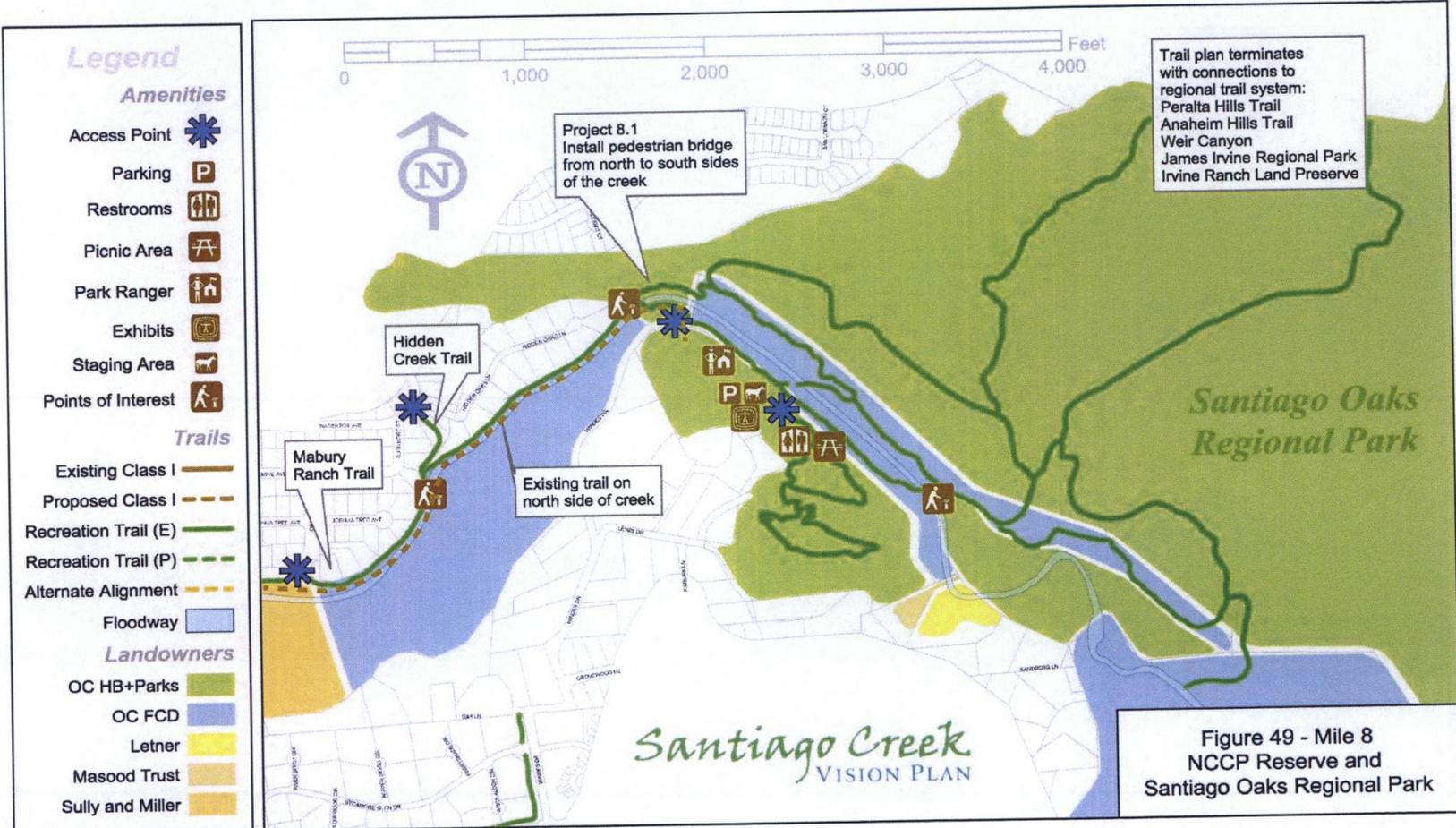


Figure 49 - Mile 8 NCCP Reserve and Santiago Oaks Regional Park

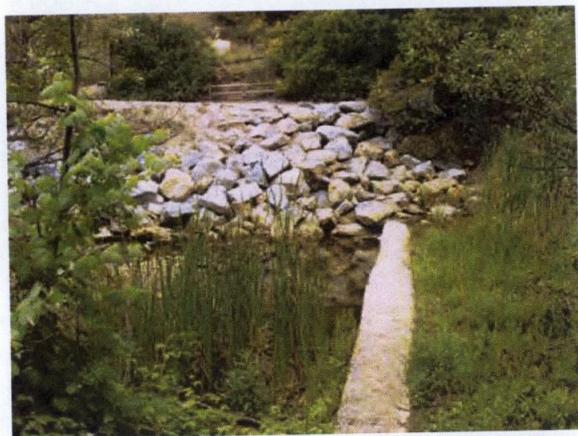


Figure 50. Old concrete dam near entrance to Santiago Oaks Regional Park

Santiago Oaks Regional Park is a unique plant and animal reserve with a mixture of riparian forest and woodland along the creek, grasslands and coastal sage scrub in the surrounding hills. In 2003 the County of Orange acquired the adjoining Barham Ranch, nearly doubling the size of the park to just under 1,000 acres. Figure 51 is a view of park showing some of the riparian woodlands and the hills to the north and east. The Barham Ranch addition is in the hills in the background of the photo.

Both the park and the Barham Ranch addition include an extensive system of recreational trails used by equestrians, mountain bikers, runners, hikers, and wildlife. This trail system connects to Weir Canyon via the Anaheim Hills Trail, to James Irvine Regional Park and Mountains-to-Sea National Recreation Trail (part of Irvine Ranch Conservancy Lands).

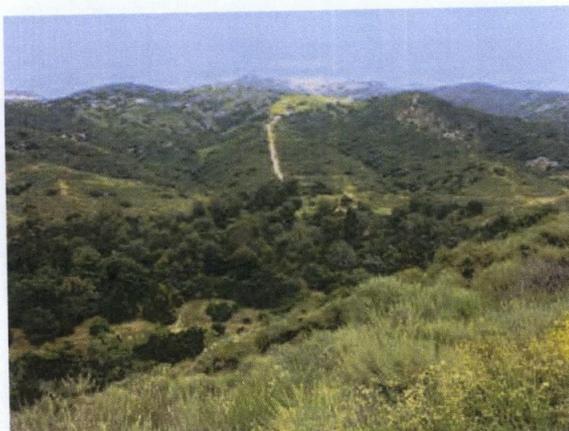


Figure 51. Woodland and hills in Santiago Oaks Regional Park..

Figure 52 is a view of one of the trails within a wooded area of the park showing some of the typical native trees and shrubbery.



Figure 52. Park trail in wooded area

3.0 Resource Management

The Santiago Creek bike path and future trails represent both recreational and transportation systems that must be maintained in order to be used by the public. Completed trail segments include two sections with landscape areas that are currently maintained by the adjacent homeowners associations. The City of Orange maintains the remainder of trails on existing parklands. Prior to the implementation of any of the potential projects listed in this Vision Plan, the issue of project funding and long term bike path and trail maintenance will need to be addressed.

Trail Construction

Any trails constructed as part of this Vision Plan will implement following Crime Prevention through Environmental Design (CPTED) Standards to maximize the safety of all trail users, whenever practical and compatible with other design criteria. The CPTED concepts include:

- Maximizing trail contour lines for visibility and natural surveillance.
- Installing maximizing lighting that meets or exceeds the City security ordinance for trails and undercrossings.
- Performing regular landscape maintenance to trim shrubs, vines and trees along the trail and at access points to provide ground clearance and visibility.
- Considering the installation of emergency phones.
- Limiting trail use to daylight hours.
- Coding trail amenities such as trash cans, benches or mile markers that allow emergency aid personnel to locate users in need of assistance along the trail.
- Maximizing the number of access areas to allow for escape routes for trail users.



Figure 54. Cardinal Catchfly in Fremont Canyon by Sam Stewart, © 2003 BonTerra Consulting, used with permission

Bike Path Maintenance

The maintenance of the asphalt trail entails emptying trash cans and replenishing dog-waste bags periodically (at least once a week but more often if required) and reapplying slurry and re-striping the asphalt periodically (approximately once every five years).

Trail Maintenance

Recreation trails composed of crushed aggregate material, decomposed granite or dirt should be inspected after rain events and be re-graded and groomed if needed to ensure that the trail does not become eroded and remains a usable recreation and transportation resource. Trash cans need to be emptied and dog-waste bags replenished periodically.

Landscape Maintenance

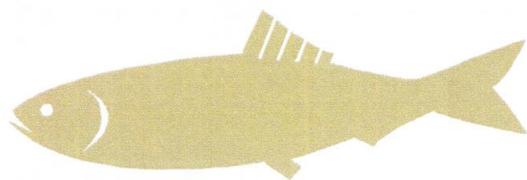
Property owners are required to control weeds on private properties. Public agencies and homeowners associations are also required to control weeds, but are not required to plant or restore any areas unless

there is a specific project requirement defined by a prior permitting process or regulatory agency such as Fish and Game, the Regional Water Quality Control Board, the city or the county.

A usable trail system should include landscaping, which is one of the key objectives of the Vision Plan. The natural resources and greenway of the creek could be installed and maintained by a variety of entities. Funding for the clearing of debris and installation of plants and water lines could be funded through small grants and donations. The native landscaping could be maintained by volunteers. However such funding and resources are limited and cannot be expected to serve the greenway or provide long term sustainability of the project sites.

Where feasible, future plans for bike paths or recreational trails should include an irrigation line with quick-disconnect couplers. This will allow the pursuit of small grants or donations for plants that can be maintained by volunteers. Without water accessible by hand carried hoses, re-vegetation of the creek and upland areas will not be feasible. The native plant material only requires watering monthly in the warm months until plant establishment is reached in two or three summers. The low amount of water and lack of overhead irrigation keeps the weed growth to a minimum.

This strategy has been successfully deployed in the restoration of the Cambridge Avenue site on the south side of the creek between Hart Park and Cambridge Avenue. The City of Orange and the Santiago Creek Greenway Alliance were awarded a joint Urban Streams Restoration Grant to address a portion of the creek and upland areas west of Cambridge, by the State of California. This grant paid for the removal of debris in the creek, installation of plants and irrigation lines with quick-connect/disconnect couplers every 100 feet. However, all of the plants were installed, weeded and watered by volunteers. The re-vegetation project was completed with an extremely low mortality rate of plants, and resulted in a successful site to recreate, watch birds, ride the trails, or just relax.



4.0 Background Information

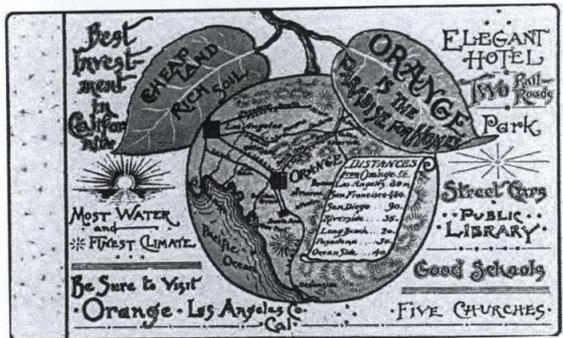


Figure 55. The Cover of a Brochure Promoting Investment in Orange, California, 1888 (Orange Public Library)

This section summarizes previous planning, studies, reports and other investigations associated with development of the plan described in the Vision Plan. Much of it will also be a valuable resource for subsequent efforts in detail planning and construction of the trail and greenway.

4.1. PREVIOUS PLANNING EFFORTS

The first known public planning effort for Santiago Creek was included as part of a larger Santa Ana River plan, in March, 1971. Working with consultants and a citizens' advisory committee, the County of Orange assessed the Santa Ana River and Santiago Creek, as a "link in the tri-county coast-to-crest greenbelt," a concept proposed more than 20 years earlier (Eckbo, Dean, Austin and Williams 1971). The corridor plan reviewed the natural resources within 1.5 miles of the river and its tributary, from the Santa Ana Mountains and Canyon to the ocean, making proposals in four geographic segments and providing recommendations for implementation. Santiago Creek was evaluated as one of the four segments.

The conceptual goals of this plan were similar to the current effort: a corridor plan, or linear greenbelt, linking park nodes and natural areas, with a continuous riding, hiking and biking trail for public use and enjoyment. Proponents expressed a desire to maintain the river's natural "look and atmosphere," with trees, informal space, and quiet solitude, in contrast to urban "busy-ness." Recreational demands would be balanced with natural lands.

The plan's specific recommendations for Santiago Creek included:

- Study flood control needs and feasibility of rehabilitating gravel pits as retention basins and regional parks, thereby alleviating future needs to line the creek with concrete to protect adjacent housing. This task was partially completed by Orange County's flood protection staff, the U.S. Army Corps of Engineers and Orange County Water District between 1988 and 1992. The county's Harbors, Beaches and Parks Division acquired several key parcels in the planning area before 1978.
- Preserve agriculture.
- Develop, enlarge or connect small parks along the creek.
- Link the creek with residential communities by acquiring the abandoned Southern Pacific Railroad "Tustin Branch" for trail use.
- Extend a trail along the creek, connecting parks.
- Preserve and protect hill settings.

Trails were regarded as the single most important objective of the 1971 corridor plan.



Figure 56. Easterly View of Santiago Canyon, circa 1915, Courtesy of Anaheim Public Library



Figure 57. Ella Buer and Minnie Hockemeyer at the Edge of Santiago Creek in James Irvine Regional Park, then known as Orange County Park, 1909 (Orange Public Library)

Trails along the River and Creek are the backbone of this entire greenway and recreation system. They are the significant continuous element. Where possible, trails should be provided on both sides of the River, with occasional crossings. It is best to plan separate trails for horseback riders, bike riders, and walkers (Eckbo, Dean, Austin and Williams 1971: 32-33).

The plan's implementation strategies were general: appointing an individual to assume administrative duties, the Santa Ana River coordinator; forming a joint powers agency, comprising county, city and water district officials; and identifying a funding strategy. A number of federal, state and local programs were reviewed. It was noted that, at the time, only 102 acres in the Santiago Creek corridor were owned by public agencies. The total Santiago Creek planning sub-area amounted to more than 1,400 acres.

The Santa Ana River – Santiago Creek plan for Orange County was adopted by the Board of Supervisors on June 23, 1971 (Wells 1976: 12, citing Resolution No. 71-724). The resolution noted the board's



Figure 58. Defroster in an Orange Grove at Santiago Oaks Regional Park

intent to appoint a coordinator and council to oversee greenbelt implementation, assigned county staff from real property and survey departments to develop an inventory of lands within the study area, and funded printing costs for additional copies of the plan. The board took subsequent actions in August of the same year, creating an ad hoc committee, assigning key staff to support the effort, and appointing a project coordinator (Ibid.: 17, Reso. No. 71-925). The following March, the board approved a greenbelt implementation program and established a governance sub-committee (Ibid.: 18, Reso. No. 72-287).

Orange Park Acres General Plan

The Orange Park Acres plan was prepared to control subdivisions and maintain the rural atmosphere of the 1,794-acre existing agricultural community, as the City of Orange grew eastward. Early agricultural and subsequent community development was made possible by ground water resources that were continuously replenished by

Santiago Creek. Under the O.P.A. Plan, Santiago Creek is the northern boundary of the community planning area (Orange Park Acres Development Committee 1973).

Year-round flow in the creek provides a prime prerequisite for a diverse biotic community along its channel, but varying levels of disturbance have reduced this potential diversity. The best development of riparian communities can be seen in the vicinity of Windes Drive where it dead ends at Santiago Creek. Here disturbance has been only moderate and the creek channel reaches 100 to 200 feet in width.

Above the Windes Drive area at the northeastern margin of the Orange Park Acres study area, Santiago Creek merges with the drainage basin of Villa Park Dam... Plant communities vary from well-developed riparian stands to highly disturbed sites supporting only weedy herbaceous species.

At the northwestern margin of the Orange Park Acres study area Santiago Creek is highly disturbed. Extensive open-pit



Figure 59. The Anaheim Turnverein Society, a singing and gymnastics group, at a picnic in Santiago Canyon, 1894, courtesy of Anaheim Public Library



Figure 60. A Farming Couple, Possibly Beata and Frank Mead, Stand with Newly Planted Avocado Trees on a Roadside in Orange Park Acres, Photo by Edward William Cochems (1874-1949) of Santa Ana, courtesy of Orange Public Library

gravel operations have drastically altered the channel shape and natural vegetation is almost lacking. (Ibid., pg. 22-23).

A biologist involved in drafting the plan observed that Santiago Creek, as it flowed through Orange Park Acres, "is a fine example of a healthy ecosystem," including airborne and aquatic insects, fish, trees, grasses and shrubs, amphibians, reptiles, birds and small mammals, plus "tremendous community aesthetic value judging from the large numbers of children using it for recreational purposes" (Ibid., pg. 25).

A survey of local residents found that most Orange Park Acres residents regarded Santiago Creek to be an asset to the community, a hope that gravel mining operations would cease and a need for more public trails in the area. The greenbelt plan is cited as an influential background document, and 450 acres of land (25 percent of the

planning area) are proposed as open space to implement that plan (Ibid., pg. 75-77; 118). The O.P.A. plan includes other goals, objectives and policies that relate to Santiago Creek and recreation trails (Ibid., pg. 97-103):

- Provide a wholesome rural atmosphere emphasizing a quiet seclusion close to nature.
- Preserve the positive features of major drainage courses and bodies of water within the area, utilizing them for recreational purposes where appropriate.
- Identify and protect unique and valuable flora and fauna.
- Preserve and enhance the natural beauty of the area.
- Promote safe trails and trail intersections with streets, providing grade separation where appropriate.
- Utilize natural drainage courses and landscaped swales, discouraging lined channels, etc.



Figure 61. Young Cyclists Ralph Goodale, Charles Pearson and Joe Elliott Pedaled to Hewes Park in El Modena for an Overnight Bicycle Trip in 1911, courtesy of Anaheim Public Library



Figure 62. An Existing Bridal Path Connects Orange Park Acres and Santiago Oaks Regional Park along Windes Drive

- Provide for continuous trail linkages throughout the O.P.A. community, connecting to county parks and trails, Santiago Creek and Handy Creek.
- Preserve Santiago Creek as a balanced ecological system and riparian area, maintaining the diversity of plant and vertebrate species while allowing for light recreational uses such as equestrian and hiking trails.
- Promote the phasing-out of gravel pit operations along Santiago Creek and promote restoration of natural amenities within the area.
- Provide for the establishment and preservation of a greenbelt along Handy Creek incorporating an equestrian trail.

The Orange Park Acres plan includes a system of recreation trails, including on- and off-street trails. The Santiago Creek Trail is among those proposed and subsequently adopted by the Orange City Council in December, 1973.

East Orange General Plan

The East Orange General Plan of 1975 recognized the rural atmosphere, wildlife and recreational values of the region, and encouraged the preservation of the El Modena volcanic hills (the range of hills between Orange Park Acres and Rancho Santiago Blvd.). It also provided for low and medium density residential development in the area west of Orange Park Acres (East Orange Planning Committee 1975: 38-41). The planning area was described as developed areas, ridgelines and hills, grassland, coastal sage scrub, citrus orchards, and sand and gravel pit mines. At the time, Santiago Creek included extensive gravel mining operations that were regarded as inconsistent with the community's desire to protect natural resources and "aesthetic values."

Isolated small stands of riparian species can still be seen within the gravel-pit operations along Santiago Creek. These appear to be secondary re-establishment of these species rather than untouched segments of the original communities. Most of these species are notable for vegetative



Figure 63. The Schulz Family at their Ranch in Santiago Canyon, Orange Public Library

reproduction by re-sprouting following disturbance. Species observed include: [willow, mule fat, mugwort and cat tail] (Ibid., pg. 31).

Riparian [forest] communities are an extremely limited, valuable natural resource in Orange County and thus, every effort should be made to preserve such areas. Gravel pit operations along Santiago Creek, however, have regrettably produced an almost sterile biological zone. Heavy equipment operations, dust and indiscriminate dumping of solid and liquid wastes have resulted in a zone with no significant diversity of either plants or animals... Every effort should be made to phase out the gravel pits and restore the natural riparian communities at the earliest possible time (Ibid., pg. 41).

The East Orange General Plan covered an area of approximately 1,900 acres. The document included a local land use plan with a range of



Figure 64. Goodding's (or Black) Willow by Richard B. Lewis III, © 2004 BonTerra Consulting, used with permission



Figure 65. Western Sycamore by Richard B. Lewis III, © 2004 BonTerra Consulting, used with permission

residential and commercial uses, but the reaches of the creek that flowed through the planning area, from the Orange Park Acres boundary to Bond Avenue, would be reserved for use as a portion of the larger "Santiago Creek Greenbelt and Regional Park." The plan included a trail system with single- and dual-purpose (bicycle and equestrian) recreational trails, while other trails would be integrated within public roadways.



Figure 66. Mule Fat by Richard B. Lewis III, © 2008 BonTerra Consulting, used with permission

Among the goals, objectives and policies expressed in the conclusion of the East Orange General Plan, one desired outcome was to provide for an open space network that would be connected to regional and community trail systems, recreational lands, greenbelts and open space to establish "appropriate continuity." Another was to create a natural riparian area along Santiago Creek, and yet another to promote natural open space corridors and encourage retention of natural vegetation and wildlife along trails (Ibid., pg. 121 and 124). The plan also promoted measured growth and a community service district, anticipating that increased property tax revenue would help implement the land use plan (Ibid., pg. 118 and 129).

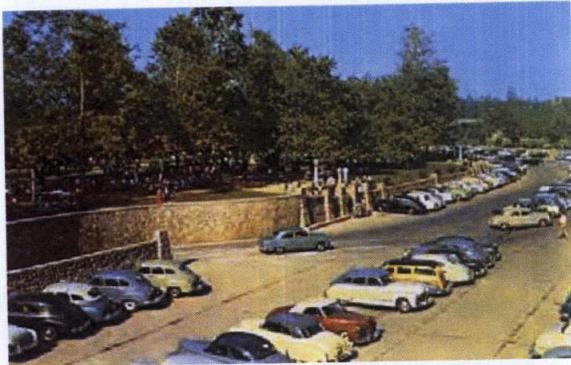


Figure 67. Picnic Area at Orange City Park, which Later Came to be Known as Hart Park, with Cars Parked in Santiago Creek in the 1950's, Orange Public Library

Santa Ana River/Santiago Creek Greenbelt Implementation Plan

This greenbelt implementation plan might be more accurately described as a status report. This document served as a thorough overview and update of prior planning efforts, using Orange County's corridor plan of 1971 as a benchmark, while incorporating known flood protection proposals and other regional projects of interest, such as water supply and waste treatment (Wells 1976: 2-10). The plan was prepared with a sense of optimism, predicting that most improvements on Santiago Creek would be completed soon after 1990.

The true value of the river may also be realized in the forms of scenic beauty, recreational facilities, preservation of historic and archeological sites, and the conservation of natural materials that are essential to the maintenance and/or improvements of our local economy... The demand for recreational facilities is directly related to the increasing population, a higher standard of living and more leisure time for recreational pursuits. The river and the creek help to

meet this demand by providing a natural setting for bicycle, equestrian and recreational facilities and linkages to other parks and recreational areas (Ibid.: 8 and 9).

The increasing demands of a growing population justified requests for support by state and federal agencies, including the California State Parks and Recreation Commission and U.S. Department of Interior. However, efforts to develop a regional, tri-county greenway were led by local activists in the Riverside-based Tri-County Conservation League and allied organizations, such as UCI's Project 21 Study Team on Preserving Open Space in Orange County, the Izaak Walton League, League of Women Voters of Orange County, California Outdoor Recreation League, League of Cities, and Sierra Club's Angeles Chapter. The county's elected officials lauded the leadership of these organizations, and established the Committee of 100 to facilitate public participation and encourage communication.



Figure 68. The Orange Lionettes: South Pacific Coast Regional Champions, 1949, Orange Public Library



Figure 69. The Lionettes Approach the Dugout at Orange City Park, 1954, Orange Public Library

By 1973, "a multi-jurisdictional, separate public agency," or joint powers authority, was formed to coordinate project implementation within Orange County: the Greenbelt Commission. The commission was comprised of three members of the County Board of Supervisors and Orange County Flood Control District, two directors of Orange County Water District, and council members from each of eight cities located within the watershed, based upon acreage in the planning area: Anaheim (two representatives), Huntington Beach (two), Newport Beach (one), Orange (four), Santa Ana (two), Villa Park (three) and Yorba Linda (two). Twenty-six citizens were appointed as members of Santiago Creek Greenbelt Committees that worked to coordinate planning on a local level. The Board of Supervisors folded the greenway plan into the county's open space element of its general plan (Ibid.: 11-15 and 18, citing Resolution No. 74-1151).

The group focus was limited to a reach of Santiago Creek that came to be known as "Lower Santiago Creek," extending from Villa Park Dam to the Santa Ana River confluence. The corridor was "arbitrarily defined" as three miles of land centered on the creek. In what may be

described as a project vision, the implementation plan states that the corridor:

...should be viewed as a linear greenbelt, linking park nodes and significant open spaces by a bicycle, equestrian and hiking trail system. The river look and atmosphere should be saved or restored as appropriate, with an emphasis on trees, informal space, and quiet contrast to the surrounding urban texture and "busy-ness." The demands for open space and recreation should be balanced according to the potential of the corridor, i.e., some areas of intensive use, some of natural preserve, [others] in-between (Ibid.: 13).

Goals expressed for Santiago Creek at this time (1976) included studying the creek's adequacy for ongoing flood protection, considering the feasibility of converting sand and gravel pits as retention basins and new parks, extending and linking the existing smaller parks located along the creek, developing a continuous recreation trail and preserving or protecting natural lands on nearby hillsides.



Figure 70. Newly Completed Bicycle Path East of Hart Park

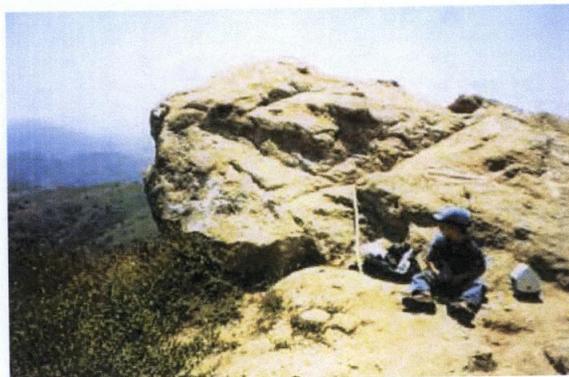


Figure 71. A Young Hiker Enjoys the View from Robbers' Roost, High above Santiago Creek, Photo by Doug Westfall

The Greenbelt Commission's implementation plan defined a range of recreational uses and facilities that could comprise a greenway, including: bicycle and equestrian facilities; state, regional, natural, community, neighborhood and miniature parks; trail rest stops, park and ride facilities, water conservation facilities; equestrian centers, golf courses and open space reserves (Ibid.: 28-30). Santiago Creek is mapped generally as one of four planning areas within Orange County, with then-vacant lands along the creek identified as "greenbelt corridor" and nearby lands noted as "impact area." General concepts are presented, such as "Lower Santiago Creek Regional Park" that was first proposed in the county's 1960 Master Plan of Regional Parks, a "live stream" extending from Santiago Dam to Walnut Avenue, sand and gravel pit rehabilitation, and development of a specific plan for Lower Santiago Creek (Ibid.: 32 and 79-82).

The implementation plan also reflects some of the planning conceived by residents or coordinated by the City of Orange and local Citizen Greenbelt Committees. Equestrian and commuter trails were proposed from Hart Park to Santiago Oaks Regional Park, each along an edge of the creek. Hart Park, initially developed in 1933,

had just recently been expanded across and south of the creek. An easterly expansion was now being discussed. Specific opportunities for development of a recreation facility and community park, the acquisition of open space, possible trail connections, park-and-ride sites, even a campground were suggested as projects. A nature preserve and wilderness area were forecast at a site that had been recently purchased by the county, later known as Santiago Oaks Regional Park (Ibid.: 86-91).

The success of this era was attributed to a strong level of community participation and interest in Santiago Creek, noted by Wells as key to the implementation of local projects.

The city's portion of the Santa Ana River/Santiago Creek Greenbelt Implementation Plan was approved by the City Council on 18 May 1976. In addition to charter membership in the Greenbelt Commission, the city has provided funds



Figure 72. Local Residents Demonstrate Interest in Using the Trail at a Recently Completed Segment upstream from Hart Park

and staff hours in support of the joint study to develop the land use decision model for Santiago Creek and Santa Ana Canyon. The city's Citizen Greenbelt Committee has been exceptionally active in the greenbelt program, and has worked closely with the committees of neighboring jurisdictions and their staffs in the development of greenbelt plans. Members of the committee have attended numerous meetings with developers regarding planned developments along the greenbelt corridor; reviewed and provided comments and recommendations to their city's planning commission and council about the compatibility of plans with the greenbelt, and in general have been a forceful, constructive influence on maintaining the inertia and quality of the greenbelt program (Ibid.: 81).

Lower Santiago Creek Specific Plan & Environmental Impact Report

The most thorough study of natural and open space resources on Santiago Creek ever undertaken, a specific plan was prepared as a practical application of prior concepts developed by the Greenway Commission, local conservation groups and others.

The intent of the study is to provide sufficient detail and guidance to enable appropriate public agencies to proceed with the acquisition of land and the construction of facilities with the assurance that these actions are in accord with an adopted plan (County of Orange 1977: 1).

The specific plan went beyond prior corridor and greenway plans in defining project sites and providing discrete parcel information that could be used in park and trail development of lands along Santiago Creek. Earlier concept plans consisted of simple, large-scale diagrams that might have been challenged had they been applied for regulatory or land acquisition purposes. The focus of the specific plan extends from Villa Park Dam to the Santa Ana River, involving the cities of Orange, Villa Park and Santa Ana. The scope of work is divided among five reaches for project implementation (Ibid: 7 and 8).

This plan also includes an overview of prior planning efforts. The work of the Greenbelt Commission and Committees is acknowledged,

but the specific plan notes that Commission was terminated soon after the publication of their implementation plan, their tasks as a planning organization now considered to be completed (Ibid.: 11-12). The specific plan includes more detail about the Santiago Creek Regional Park that was proposed in a past update of the county's master plan of parks.

In 1960 the Orange County Board of Supervisors undertook the task of reducing the acute shortage of regional park space in the county... One of the designated park sites is a 636.4 acre area located along Santiago Creek in the vicinity of the then-existing sand and gravel pits northeast of Chapman Avenue... Sketchy conceptual plans indicate the possible use of the park for water recreation, camping, horseback riding, picnicking and playing field activities. Lower Santiago Creek Regional Park has been designated one of the highest priority sites and is proposed for implementation before 1980 (County of Orange 1977: 17).

That park would have extended from a point where Windes Drive and Santiago Creek nearly converge – now the entrance to Santiago Oaks Regional Park – downstream to the Southern Pacific Railroad's "Tustin Branch" crossing of the creek. The concept of an extended greenway grew with development of a "Master Plan of Riding and Hiking Trails," adopted by the Board of Supervisors January 20, 1965. This component of the county's general plan "delineates a trail along Santiago Creek from the Santa Ana River to Silverado Canyon Road which is located immediately upstream of Irvine Lake" (Ibid.: 17). The 1971 greenbelt plan is noted to have more fully articulated the trail concept, expanding it from a simple trail to an enhanced corridor of natural lands and recreational space. County plans have subsequently reinforced the Santiago Creek trail, including:

- A Feasibility Study of a County wide Bicycle System in Orange County, adopted by the county board September 29, 1971.
- Master Plan of County wide Bike Trails, adopted March 20, 1974.
- County wide Cooperative Bikeway Financing Program; December 11, 1974.



Figure 73. The Southern Pacific Railroad Crossing of Santiago Creek, with Walnut Avenue visible on the Left and a Creek Disturbed by Mining Operations, Photo Approximately 1951, Courtesy of Doug Westfall

- Trails for the Orange Park Acres, Cowan Heights, El Modena Area; December 17, 1974.
- Arterial Bikeway System Financing and Implementation Plan and Detailed Fiscal Year 1975-76 Program; June 3, 1975 (Ibid.: 17-18).

Postscripts to Prior Planning Efforts

While many public resources, opportunities for land acquisition and private recreational resources were identified as existing in the Corridor and Greenbelt plans and Specific Plan (County of Orange 1977: 30), some no longer exist as undeveloped lands or properties that would otherwise be available for consideration.



Figure 74. Mining Operations Intensified as Urban Development Encroached on the Creek, in a Photo Taken Sometime Before 1969. The Cul-de-sac in the Foreground is Madison Avenue, and Prospect Elementary School is Visible in the Background, Courtesy of Doug Westfall

- Villa Park Country Club – approximately 13 acres of private property located downstream of Santiago Oaks Regional Park, developed as a residential tract known as “Hidden Creek.”
- 30-acre school site in OPA – north of Santiago Canyon Road at Orange Park Boulevard, sold by Orange Unified School District as surplus property, now developed as 30 home tract known as “The Reserve.”
- Sully-Miller Properties – approximately 117 acres of former sand and gravel mines (private property) now in escrow with a home builder; project status pending revision, negotiation and review.

- Orange County park site – “Strawberry field” sold by the County Board of Supervisors as part of the agency’s assets disposal and recovery program after the 1993 agency bankruptcy; now developed with residential homes.
- Bond and Smith Pits – 365 acres of private property acquired and developed by Orange County Water District for operation as a ground water recharge facility; public access not permitted for any purpose at this time.
- Conrock lands -- private property sold to Watt Homes (later subsumed by Beazer) and developed as Rock Creek Ranch, and the Huntington.
- Santiago Golf Course, private land once developed as a nine-hole course, sold and developed as a residential gated community.
- “City of Orange” Landfill, private property located within (though not operated by) the city, most recently purchased by Chapman Santiago Partners, currently being marketed as a site for residential development.
- Fowler Gravel Pit, adjacent to Hart Park on the south side of the creek, developed as “Morningside on the Lake” a condominium project.

City of Orange General Plan

Santiago Creek is identified as providing opportunities and constraints within Land Use, Safety, Open Space and Conservation Elements of the city’s General Plan (City of Orange 1989). Related goals of the general plan include the following:

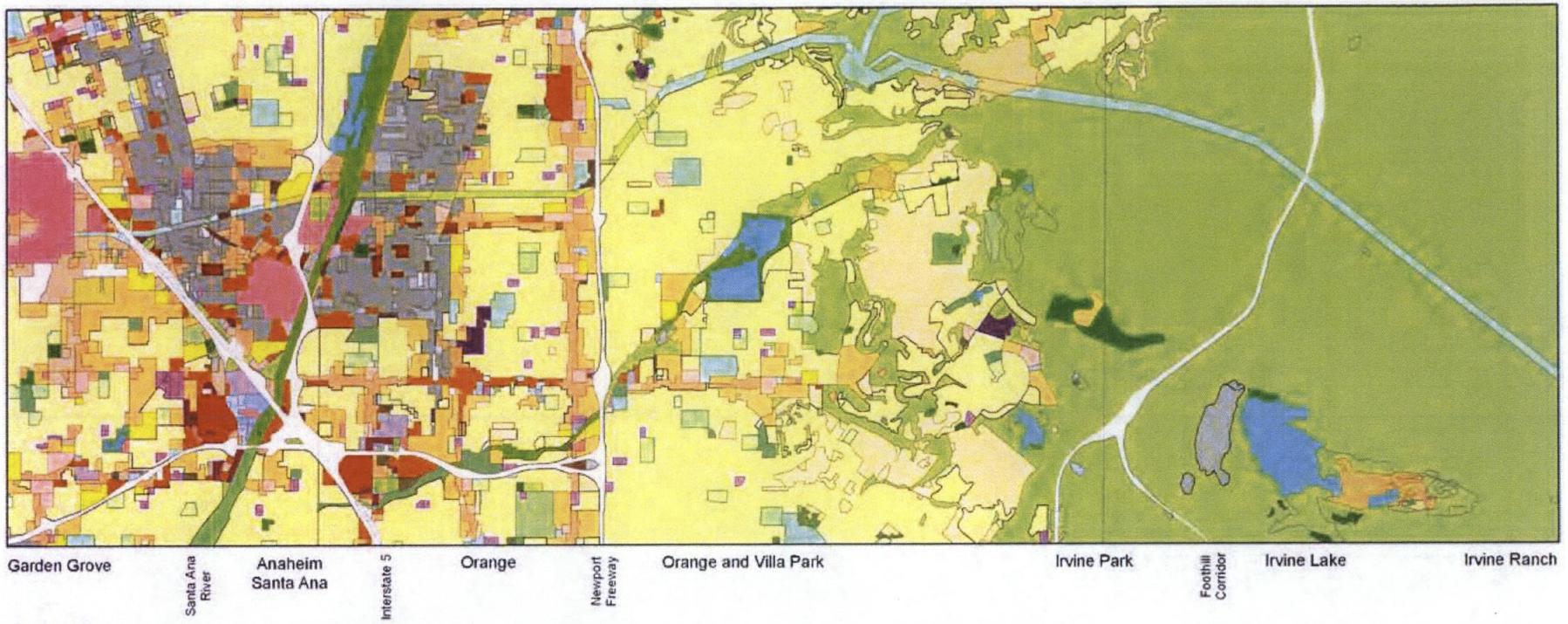
- Maintain open space resources for enjoyment of recreational resources and conserve natural resources, while protecting the public from hazard (Ibid., Land Use Element: 14).
- Acquire and reserve land as open space if land is determined to possess unusual scenic qualities or threaten public safety, and develop and maintain a system of recreational and open space uses such as parks and trails (Ibid., Land Use Element: 19).
- Protect the surface water and ground water resources (Ibid., Open Space and Conservation Element: 1).
- Protect, conserve and enhance the city’s environmental

and recreational resources (Ibid., Open Space and Conservation Element: 5).

- Take an active role in managing and conserving plant and animal resources in the city (Ibid., Open Space and Conservation Element: 7).
- In addition to serving important flood protection and ground water recharge functions, Santiago and Handy Creeks are unique open space resources and are therefore designated as continuous “open space” on the city’s land use plan (Ibid., Open Space and Conservation Element: 16).
- Develop a continuous recreation trail along Santiago Creek, connecting Hart Park and Santiago Oaks Regional Park (Ibid., Open Space and Conservation Element: 36).

The general plan also contains some important observations, precautions and assumptions that will affect the future of Santiago Creek:

- Flood risk from Santiago Creek is noted in the event of 100- or 500-year storms, or if a dam were to fail (Ibid., Land Use Element: 19).
- The Recreation Element of the county’s general plan is cited, noting proposed open space acquisitions, parks and recreation trails. The county’s recreation master plans provides for considerable expansion of public park land upstream from Santiago Oaks Regional Park, at Weir Canyon, Peters Canyon Reservoir, and Villa Park Basin; within the Santiago Creek watershed but outside this study’s planning area boundary (Ibid., Open Space and Conservation Element: 2).
- The city should coordinate any changes in land use policy that might affect “regionally significant” aggregate resources, located along Santiago Creek, with appropriate state authorities (California Division of Mines and Geology) (Ibid., Open Space and Conservation Element: 7, 18-19).



Legend

- | | | | | | |
|--|-------------------------------------|--|---|--|--------------------------------|
| Undeveloped Natural Lands | Pre-Schools/Day Care Centers | Modern Strip Development | Medium-Rise Apartments and Condominiums | Electrical Power Facilities | Wholesaling and Warehousing |
| Wildlife Preserves and Sanctuaries | Elementary Schools | Retail Centers (Non-Strip) | Mixed Multi-Family Residential | Freeways and Major Roads | Heavy Industrial Services |
| Other Open Space and Recreation | Junior or Intermediate High Schools | Hotels and Motels | High-Rise Apartments and Condominiums | Vacant With Limited Improvements | Orchards and Vineyards |
| Improved Flood Waterways and Structures | Senior High Schools | Rural Residential, Low-Density | Government Offices | Park-and-Ride Lots | Research and Development |
| Developed Local Parks and Recreation | Colleges and Universities | Rural Residential, High-Density | Communication Facilities | Natural Gas and Petroleum Facilities | Special Care Facilities |
| Developed Regional Parks and Recreation | Commercial Recreation | Low-Density Single Family Residential | Fire Stations | Packing Houses and Grain Elevators | Religious Facilities |
| Golf Courses | High-Rise Major Office Use | High-Density Single Family Residential | Police and Sheriff Stations | Truck Terminals | Trade and Professional Schools |
| Cemeteries | Commercial Storage | Trailer Parks and Mobile Home Parks | Correctional Facilities | Non-Attended Public Parking Facilities | Vacant Area |
| Non-Irrigated Cropland and Improved Pasture Land | Mixed Commercial and Industrial | Duplexes or Triplexes | Major Medical Health Care Facilities | Solid Waste Disposal Facilities | Water Transfer Facilities |
| Irrigated Cropland and Improved Pasture Land | Regional Shopping Center | Mixed Residential | Under Construction | Open Storage | Water, Undifferentiated |
| Nurseries | Major Office Use | Apartments, Condominiums, and Townhouses | Mineral Extraction - Other Than Oil and Gas | Maintenance Yards | Water Storage Facilities |
| Other Agriculture | Older Strip Development | Mixed Urban | Horse Ranches | Manufacturing | |

Figure 75. Existing Land Use Data Provided by Southern California Association of Governments, Compiled Before 2000, with the Santiago Creek Corridor Visible near the Center

Irvine Company Lands in the Watershed

The Irvine Company owns approximately 28,000 acres at the center of Santiago Creek's watershed. Plans to develop a residential community are pending review, final approval and project implementation. The Irvine Company has dedicated approximately 11,000 acres as open space within the watershed. This acreage will provide habitat, trail and natural space linkages between Weir, Fremont and Limestone Canyons. The company is also using best available technologies and management practices to retain storm water runoff and minimize urban discharges to Santiago Creek.

Recreation Trails Master Plan

Building upon the goals, objectives and policies contained within its general plan, the city developed a more detailed master plan for recreation trails in 1993. This plan is the most exhaustive trail planning effort undertaken by the city, including trail designs for a range of user groups (equestrian, pedestrian and cyclist; non-motorized use only) and a citywide map consisting of 107 discrete trail projects, ranging from fractions of a mile to several miles in length, with 46 trail miles proposed and 15 miles completed (Recreational Trails Advisory Committee 1993).

Because of the comprehensive or long-range nature of the planning document and need to secure easements and right of way across land, flexibility is emphasized and changes in specific trail alignments were anticipated (Ibid., pg. IN.2). The Santiago Creek Trail is identified as a collective series of individual trail segments. In an effort to help prioritize, the committee organized projects into phases. Phase 1 projects are described in Table 9.

Since the time when the master plan was completed, a public trail segment was constructed within a residential development project known as "Sycamore Crossing" between Cambridge and Tustin Streets. Segment number 94 is therefore partly completed.

The recreation trail plan indicates that the Santiago Creek Trail has the potential to be connected with a citywide network of trails, with intersections and access points at both existing and planned on-street and off-street recreation trail facilities: Santiago Oaks

Index No.	Location	Miles	Phasing*	Status
10	Creek crossing, Hidden Oaks tract into Santiago Oaks Park	0.10	1	Incomplete
29	North side creek along Mabury Ranch	0.49	(E)	Existing
	South side creek, through Fieldstone Project		1	Incomplete
26	North side creek, east of Cannon to Mabury Ranch	0.26	1	Incomplete
23	North side creek, west of Cannon to old Santiago Blvd.	0.52	1	Incomplete
21	OCWD recharge facility north of Villa Park Road	0.34	1	Incomplete
90	OCWD recharge facility, west of Hewes Street	0.86	1	Incomplete
91	OCWD recharge facility, north of Bond Avenue	0.53	1	Incomplete
93	Along trapezoidal channel at Rock Creek Ranch	1.24	(E)	Existing
94	Lower Santiago Creek: Chapman Avenue to Hart Park	2.7	1	Incomplete
	Total length anticipated	7.04		

*as defined within Master Plan
E = Existing



Figure 76. Bicycle Bridge is Installed over Santiago Creek, downstream of Glassell Street



Figure 77. Existing Public Maintenance Road on Santiago Creek, at Hidden Creek Development

Regional Park, Mabury Ranch and Orange Park Acres (residential communities), Cannon Street, Hewes Street and Villa Park Road, Prospect Street and Collins Avenue, and the Tustin Branch of the former Southern Pacific Railroad.

Staging areas for the Santiago Creek Trail are proposed on the west side of Cannon Street, at Hart and Yorba Parks. A rest stop is also proposed at Walnut Avenue, which is near and substantially augmented by newly constructed facilities at Grijalva Park (Ibid., pg. MP.13–MP.14). The master plan also includes trail standards and construction details. In order to comply with the city's master plan, the Santiago Creek Trail will require a minimum width of 10 feet within an easement of 18 feet. Exceptions are made for "special circumstances" where land constraints exist; however, an absolute width of 6 feet is required within a 10 foot easement, so long as "turnouts" are provided for every 150 feet of trail length.

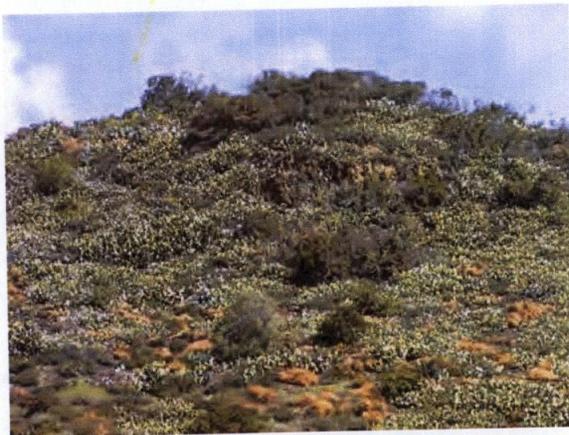


Figure 78. Coastal Pricklypear in Santiago Hills by Richard B. Lewis III, © 2003 BonTerra Consulting, used with permission

Implementation measures are also presented within the Recreation Trails Master Plan (Ibid., pg. I.2-I.3). Among those relevant to the Santiago Creek Trail are:

- Continue to acquire land and trail improvements through exactions and mitigation measures when development is proposed along Santiago Creek, under the city's development review process.
- Encourage density trade off's, transfers of development rights or clustered development to allow more intensive uses on sites that include creek ownership.
- Negotiate open space easements or agreements that provide tax incentives for private property owners.
- Seek grant money from corporate sources. Consider companies located near the creek, whose employees would gain recreation and transportation benefits from trail use.
- Establish or support a non-profit advocacy group that is dedicated to the success of the project. A "friends" group might also become effective in attracting donations and facilitating project work.
- Develop, support or employ a local service organization that will provide a base of volunteer or skilled labor.
- Consider an "adopt a trail" program or the ability to name features in the landscape in response to large (individual or corporate) gifts.
- Identify sub-projects or individual trail and greenway components that might be sponsored as individual or corporate projects.

The master plan summarizes appropriate sections of California law that would allow the city to establish fees and general income for trail development, and state and federal programs available when the plan was produced in 1993. The implementation section of the city's master plan ends with a statement advising that:

In current times of limited city budgets and therefore a declining ability to provide the necessary recreational



Figure 79. Coastal Pricklypear by Richard B. Lewis III, © 2005 BonTerra Consulting, used with permission

amenities to the community, non-profit groups such as the Orange Park Acres Association will be invaluable in obtaining funds for trail implementation and for coordinating volunteer construction of trail segments... Completion of the trail system will only be possible through partnership[s]... (Ibid., pg. I-11).



Figure 80. Giant Swallowtail by Richard B. Lewis III, © 2008 BonTerra Consulting, used with permission

Current Projects

The city hired an engineering and landscape architect team to produce a specific trail alignment and construction plan for trail segments identified in the city's Recreation Trails Master Plan 93 and 94 (KFM Engineering 2002). Construction of a small segment of this trail (from Hart Park to Cambridge Street) was completed in 2003.

Additionally, KFM produced plans for the Tustin Branch rail-to-trail project. The Tustin Branch line of the Southern Pacific Railroad was abandoned in 1969. The development of the railroad right-of-way

as a recreation trail would have provided dedicated, off-road trail connections to the Esplanade Trail in north Tustin and to the Santa Ana River Trail in northwest Orange. However, the City of Orange was unable due to citizen opposition, to acquire the railroad right-of-way.

Land and Water Conservation Funds

The City of Orange has received several awards of Land and Water Conservation Funds by California State Parks, in partnership with the federal government. Funds have been used in the past to expand Hart Park and develop Grijalva Park.

Brownfield Remediation Grant-Phase I Grijalva Park

The Environmental Protection Agency awarded \$200,000 to the City of Orange in 2002, to study property purchased from Union Pacific Railroad. The property included fill material and was once used by the railroad as active right of way. The property includes an underground petroleum products distribution pipeline. The site was most recently used by a lessee as an asphalt and concrete batching plant but is now being developed as Phase I of Grijalva Park.



Figure 81. Arroyo Toad by Sam Stewart, © 2008 BonTerra Consulting, used with permission



Figure 82. Bewick's Wren by Richard B. Lewis III, © 2003 BonTerra Consulting, used with permission

Grijalva Park Phase II, Gymnasium and Aquatic Park

The city is currently planning to expand the newly constructed Grijalva Park, including construction of a gymnasium, and future phases will include an aquatic facility, amphitheater, community center and additional parking. The development would have access from the existing park entrance at the intersection of McPherson Street and Spring Avenue, augmenting newly constructed access from Walnut Avenue and Prospect Street.

Urban Streams Restoration Grant

In 2002, the city was awarded an Urban Streams Restoration Grant for a restorative demonstration project located on the south side of the creek, west of Cambridge Street. The city hired a consultant to develop a planting plan, and used volunteers to plant and water native plants. The property is currently being maintained by local volunteers.

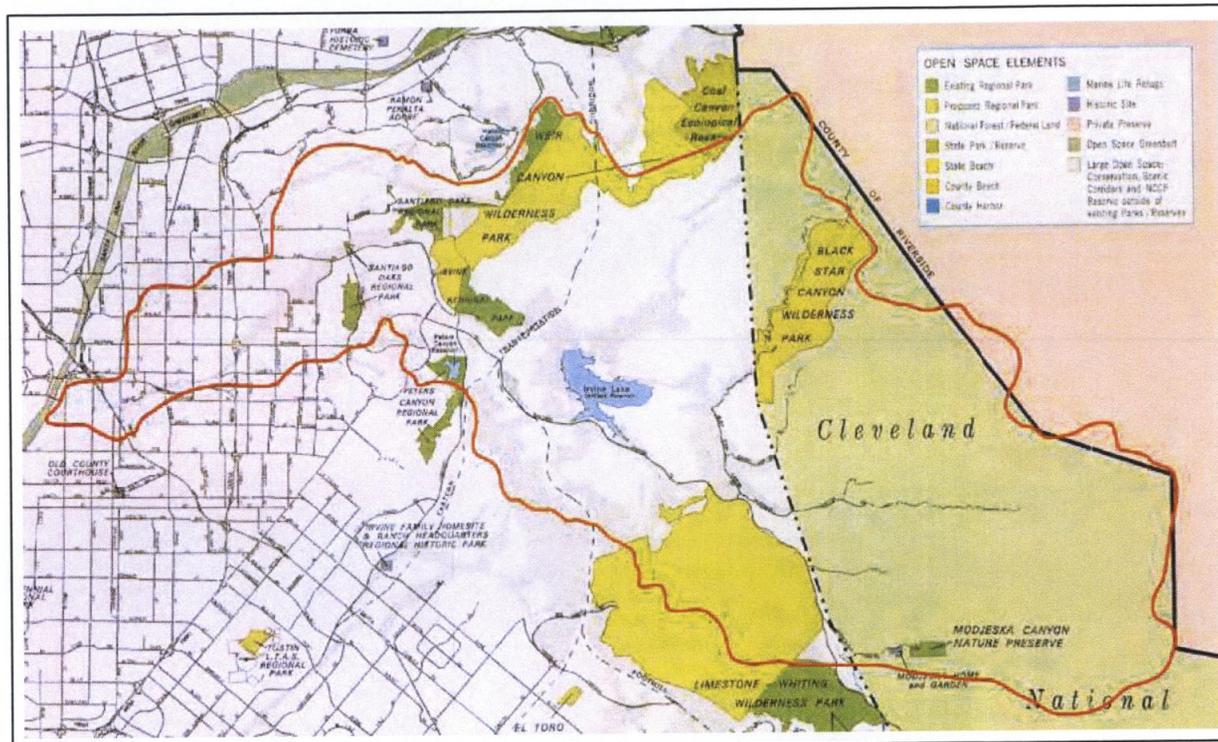


Figure 83. Santiago Creek Watershed Boundary Imposed on a Detail of Existing and Proposed Regional Parks, Significant and Unprotected Open Space and Natural Lands in Orange County



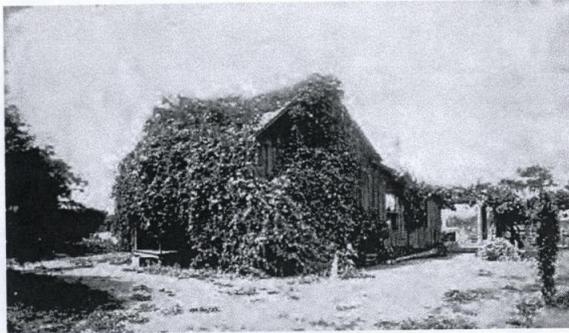


Figure 84. Home of Henry Fitch Gardner, Owner of a 20-acre Ranch that Ran from La Veta Avenue to Santiago Creek along South Glassell Street, circa 1890, Orange Public Library



Figure 85. Hoyt Hill, Thought to be the Site of an Adobe Constructed by Juan Pablo Grijalva in the early 1800's



Figure 86. Much of Santiago Creek flows across Lands Acquired by Public Agencies, but Some Portions Remain Private Property



Figure 87. Jane and Charles P. Taft, Local Growers of Loquats and Avocados, circa 1905, Orange Public Library

4.2. PROPERTY OWNERSHIP ON THE CREEK

This section identifies the many owners of property adjacent to Santiago Creek. Figures 54 through 59 are aerial photos with overlays indicating the location, size and property owners in each mile segment of the study area. Tables 10.1 through 10.7 provide a more detailed listing of the properties including their parcel number and current use as of September 2007.

The overlay data for the aerial photos and the tables was provided by a Geographic Information System (GIS) which is maintained by the City of Orange.

The acreage owned by the various property owners along the creek is summarized below.

Agency or Entity	Acreage
City of Orange	107.13
OC Flood Control District	103.68
OC Real Property	19.88
OC IWMD	17.29
OC Health	1.59
OC RDMD-OC Parks	213.45
OC Water District	273.12
Caltrans	17.29
Other Water Agencies	3.51
City of Santa Ana	1.12
Private Owners	<u>135.97</u>
Study Area Total	894.03



Figure 88. Grand Street Steps Descend into Hart Park

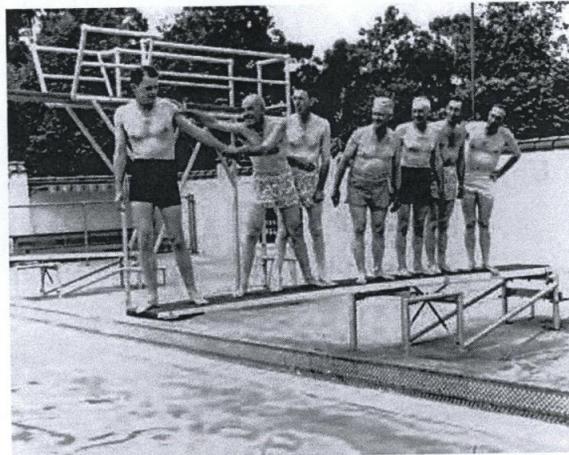


Figure 89. Leo Mathis, Pat Richardson, Vic Sutton and Friends at the Orange City Park plunge in 1950, Orange Public Library

Site	A.P. Number	Land Owner	Current Use	Acres
1.1	390-701-08	City of Santa Ana	Police Dept. Training	1.12
1.2	S.R. 22	Caltrans	Freeway Overcrossing	4.00
1.2	S.R. 22	Caltrans	Freeway Overcrossing	0.67
1.3	390-591-09	City of Orange	Creek and uplands	1.00
1.3	390-591-08	City of Orange	Creek and uplands	0.93
1.4	390-111-05	City of Orange	Hart Park (portion)	17.34
1.4	390-161-01	City of Orange	Hart Park (portion)	5.22
1.4	390-041-03	City of Orange	Hart Park (portion)	3.49
1.4	390-061-02	Caltrans	Hart Park (Fwy adjacent)	6.07
1.4	390-041-04	Caltrans	Hart Park (Fwy adjacent)	3.17
1.4	390-103-17	City of Orange	National Guard Armory	2.67
1.5	390-021-03	City of Orange	Creek and uplands	11.63

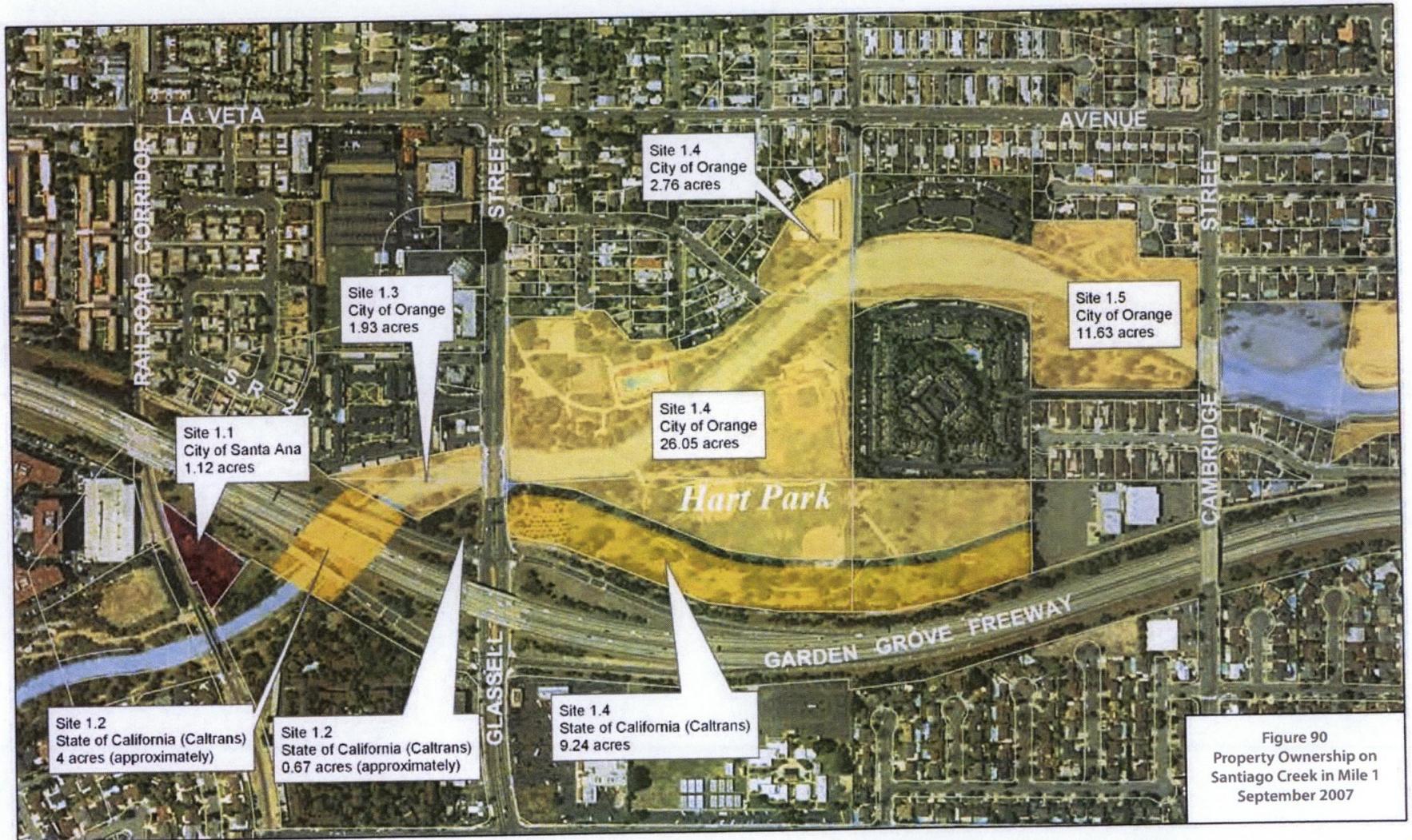


Figure 90
 Property Ownership on
 Santiago Creek in Mile 1
 September 2007



Figure 91. Black Phoebe by Richard B. Lewis III, © 2002 BonTerra Consulting, used with permission



Figure 92. Bluebells by Richard B. Lewis III, © 2003 BonTerra Consulting, used with permission

Table 12. Property Ownership in Mile 2

Site	A.P. Number	Land Owner	Current Use	Acres
2.1	390-371-07	OCFCD	Creek and uplands	4.45
2.1	390-351-07	OCFCD	Creek and uplands	5.36
2.2	390-351-03	City of Orange	Upland Area	1.00
2.2	390-351-04	City of Orange	Upland Area	0.11
2.2	390-351-05	City of Orange	Upland Area	1.23
2.2	390-351-06	City of Orange	Upland (unpaved bench)	1.35
2.2	390-351-08	City of Orange	Sycamore Crossing Trail	2.27
2.2	390-351-09	City of Orange	Upland Area (Landscaped)	1.30
2.3	390-321-01	OCFCD	Creek and uplands	0.73
2.3	390-321-05	OCFCD	Uplands	0.23
2.3	390-151-22	OCFCD	Creek and uplands	1.61
2.4	390-151-21	MWD of So. Cal.	Creek and uplands	0.19
2.4	390-151-19	MWD of So. Cal.	Creek and uplands	1.94
2.5	390-151-20	OC Health	Parking Facility in Creek	1.59
2.6	390-151-15	OCFCD	Creek and uplands	0.04
2.6	390-141-15	OCFCD	Creek and uplands	4.08
2.7	390-141-14	Chatham Health LLC	Upland Area	1.47

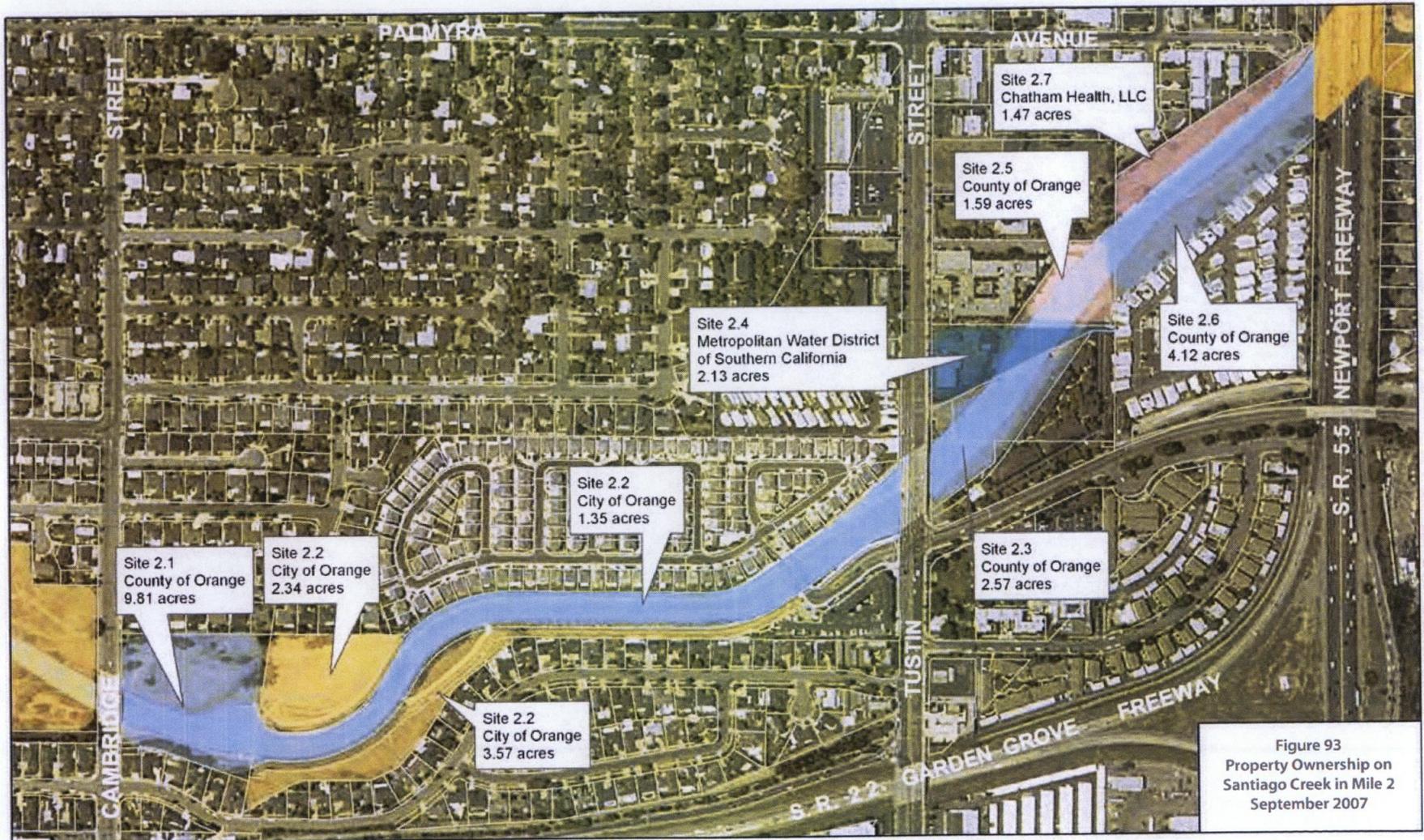




Figure 94. Cassin's Kingbird by Sam Stewart, © 2004 BonTerra Consulting, used with permission



Figure 95. White Alder Sprouting in Cobble and Sand by Richard B. Lewis III, © 2005 BonTerra Consulting, used with permission

Table 13. Property Ownership in Mile 3

Site	A.P. Number	Land Owner	Current Use	Acres
3.1	S.R. 55	Caltrans	Freeway overcrossing	4.00
3.1	392-052-23	Caltrans	Creek embankment	0.12
3.2	392-071-04	City of Orange	Creek and uplands	4.64
3.3	392-071-05	YMCA	Creek	1.37
3.3	392-071-06	YMCA	Recreation facility	3.30
3.3	Easement	YMCA	Creek embankment	0.47
3.4	392-061-01	OCFCD	Creek embankment	0.68
3.5	392-061-02	City of Orange	Yorba Park	7.88
3.6	093-010-54	Caltrans	Creek embankment	0.26
3.7	093-010-51	OCFCD	Creek and uplands	0.39
3.7	093-010-52	OCFCD	Creek and uplands	4.71
3.7	093-010-68	OCFCD	Creek embankment	0.34
3.7	093-010-53	OCFCD	Upland area	1.38
3.7	093-011-58	OCFCD	Creek (Chap-Santiago)	2.21
3.7	383-221-24	OCFCD	Creek and uplands	3.25
3.8	083-010-57	Chap-Santiago Ptnrs	Upland area	0.41
3.9	093-010-64	Chap-Santiago Ptnrs	Upland area	8.21
3.10	383-231-03	City of Orange	Creek Basin and uplands	9.94
3.10	093-031-02	City of Orange	Grijalva Park, Phase II	17.58
3.11	383-233-46	Cal-Fed	Creek and uplands	1.41
3.11	383-233-47	Cal-Fed	Creek	0.07
3.12	093-031-01	City of Orange	Grijalva Park	14.59



Figure 96
Property Ownership on
Santiago Creek in Mile 3
September 2007



Figure 97. Black Sage by Richard B. Lewis III, © 2004 BonTerra Consulting, used with permission



Figure 98. Splendid Mariposa Lily by Richard B. Lewis III, © 2004 BonTerra Consulting, used with permission

Table 14. Property Ownership in Mile 4

Site	A.P. Number	Land Owner	Current Use	Acres
4.1	383-181-25	OCFCD	Creek	0.50
4.2	383-193-65	City of Orange	Vacant	0.68
4.2	383-181-30	City of Orange	Partial Tustin Branch RR line	0.24
4.2	383-281-18	City of Orange	Well site	0.16
4.3	383-281-17	OC PFRD OC Parks	Parkland-dedicated to public	1.25
4.4	383-181-17 383-181-09	Dorothy Cauffman	Vacant; adjacent to MH Park	0.62
4.4	Easement	Dorothy Cauffman	Upper edge of creek	0.37
4.4	383-181-16 383-181-09	Dorothy Cauffman	Upper edge of creek	0.10
4.4	Easement	Dorothy Cauffman	Upper edge of creek	0.27
4.5	383-181-28	City of Orange	Upper edge of creek	0.31
4.5	383-181-12	City of Orange	Upper edge of creek	0.56
4.5	383-071-38	City of Orange	Upper edge of creek	0.01
4.5	383-071-40	City of Orange	Upper edge of creek	0.04
4.5	383-071-06	City of Orange	Upper edge of creek	0.30
4.6	383-181-32	OCFCD	Creek and uplands	3.12
4.6	383-181-27	OCFCD	Creek and uplands	3.99
4.6	383-181-29	OCFCD	Creek and uplands	3.86
4.6	383-181-26 383-071-04	OCFCD	Creek and uplands	2.32
4.6	Easement	OCFCD	Upper edge of creek	1.32
4.6	383-071-37	OCFCD	Upper edge of creek	0.23



Figure 99
Property Ownership on
Santiago Creek in Mile 4
September 2007



Figure 100. Coast Indian Paintbrush by Richard B. Lewis III, © 2005 BonTerra Consulting, used with permission



Figure 101. Coyote Brush by Richard B. Lewis III, © 2002 BonTerra Consulting, used with permission



Figure 102. Coast Live Oak by Richard B. Lewis III, © 2008 BonTerra Consulting, used with permission

Table 15. Property Ownership in Mile 5

Site	A.P. Number	Land Owner	Current Use	Acres
5.1	383-101-01	City of Orange	Water well site	0.38
5.2	383-101-02	OC Water District	Recharge basin	50.25
5.2	383-101-13	OC Water District	Recharge basin	27.84
5.2	378-251-33	OC Water District	Recharge basin	0.13
5.2	378-251-32	OC Water District	Recharge basin	5.00
5.2	378-421-03	OC Water District	Recharge basin	8.83
5.2	378-421-04	OC Water District	Recharge basin	13.83
5.2	378-421-13	OC Water District	Recharge basin	1.04
5.2	378-421-02	OC Water District	Recharge basin	18.98
5.2	378-421-07	OC Water District	Recharge basin	19.52
5.2	378-442-04	OC Water District	Recharge basin	8.72
5.2	378-442-02	OC Water District	Recharge basin	6.87
5.2	378-421-08	OC Water District	Recharge basin	1.17
5.2	378-212-14	OC Water District	Recharge basin	3.54
5.2	378-432-02	OC Water District	Recharge basin	30.76
5.2	378-442-01	OC Water District	Recharge basin	21.92
5.2	378-432-03	OC Water District	Recharge basin	2.89
5.2	378-432-04	OC Water District	Recharge basin	1.51
5.3	378-221-23	OCFCD	Basin outlet	9.20

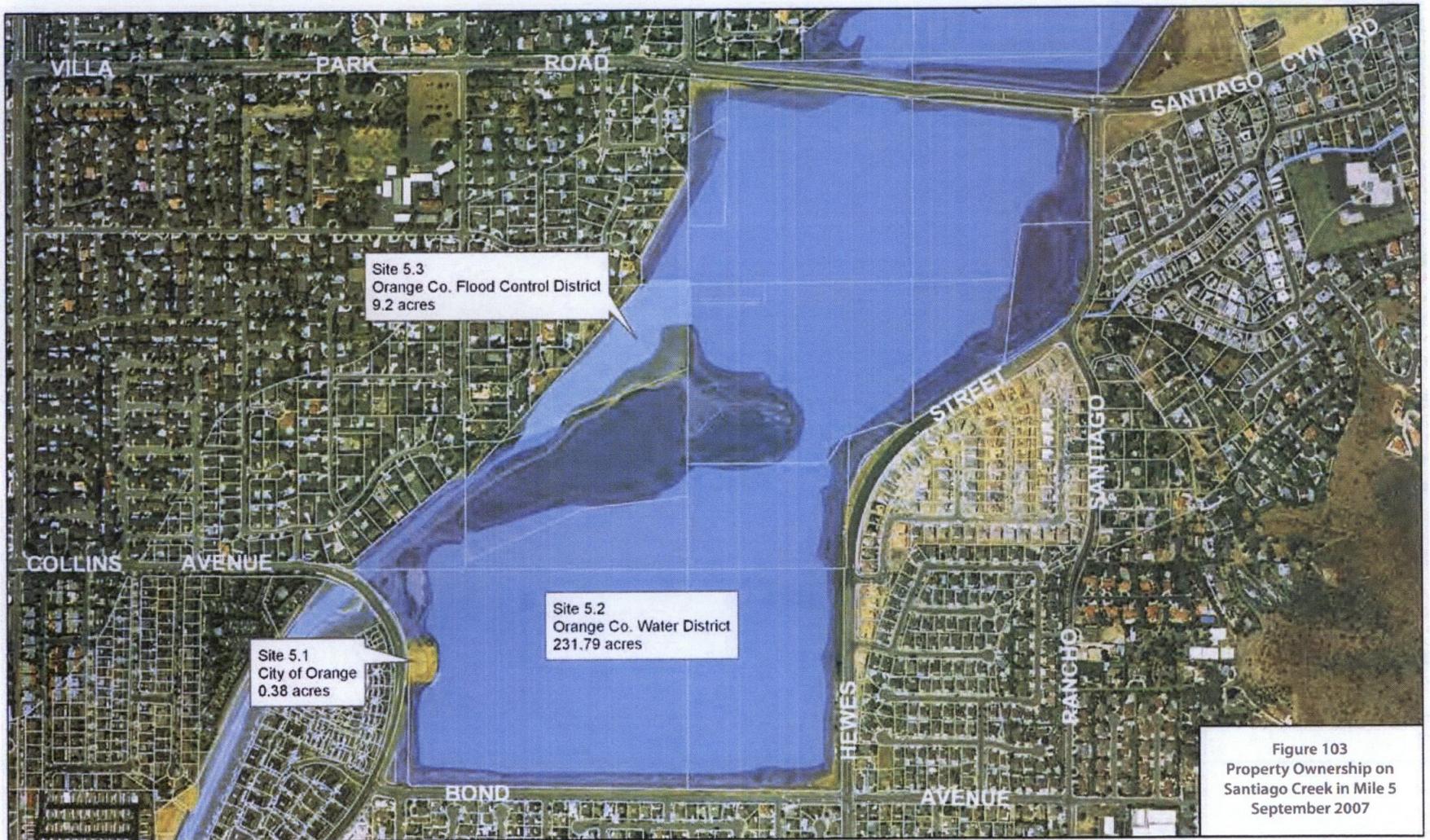


Figure 103
Property Ownership on
Santiago Creek in Mile 5
September 2007



Figure 104. Mule Fat by Richard B. Lewis III, © 2004 BonTerra Consulting, used with permission



Figure 105. Laurel Sumac by Richard B. Lewis III, © 2004 BonTerra Consulting, used with permission



Figure 106. Goodding's (Black) Willow by Richard B. Lewis III, © 2004 BonTerra Consulting, used with permission

Site	A.P. Number	Land Owner	Current Use	Acres
6.1	378-431-02	OC Water District	Recharge basin	1.93
6.1	378-441-06	OC Water District	Recharge basin	5.00
6.1	378-103-19	OC Water District	Recharge basin	5.11
6.1	383-441-04	OC Water District	Recharge basin	17.82
6.1	383-441-05	OC Water District	Recharge basin	11.48
6.2	370-231-10	Annette Hurwitz	Former sand mine	14.42
6.3	370-231-06	Greek and Sandberg	Undeveloped riparian	0.42
6.4	370-231-05	OC PFRD HPB	Park property	2.17
6.4	370-042-07	OC Real Property	Disturbed Area	5.81
6.4	370-042-01	OC Real Property	Creek	0.38
6.5	370-081-31	OCFCD	Creek and uplands	0.92



Figure 107. Coast Range Newt by Sam Stewart, © 2007 BonTerra Consulting, used with permission



Figure 108
Property Ownership on
Santiago Creek in Mile 6
September 2007



Figure 109. Southern California Black Walnut by Richard B. Lewis III, © 2005 BonTerra Consulting, used with permission



Figure 110. California Wild Rose by Richard B. Lewis III, © 2005 BonTerra Consulting, used with permission



Figure 111. California Bush Sunflower by Richard B. Lewis III, © 2004 BonTerra Consulting, used with permission



Figure 112. California Tree Frog by Sam Stewart, © 2003 BonTerra Consulting, used with permission

Table 17. Property Ownership in Mile 7

Site	A.P. Number	Land Owner	Current Use	Acres
7.1	370-041-10	OC IWMD	Villa Park Landfill	0.25
7.1	370-041-11	OC IWMD	Villa Park Landfill	6.28
7.1	370-041-26	OC IWMD	Villa Park Landfill	1.52
7.1	370-041-27	OC IWMD	Villa Park Landfill	9.24
7.2	370-141-19	Milan Capital	Creek and uplands	3.47
7.2	370-041-12	Milan Capital	Disturbed area	3.14
7.2	370-041-25	Milan Capital	Disturbed area	5.07
7.2	370-011-08	Milan Capital	Creek uplands & agriculture	12.17
7.2	370-011-18	Milan Capital	Creek uplands & agriculture	15.09
7.2	370-011-21	Milan Capital	Agriculture & uplands	9.45
7.2	370-011-22	Milan Capital	Agriculture & equipment storage	14.04
7.2	093-281-07	Milan Capital	Disturbed area	6.04
7.2	093-281-27	Milan Capital	Stockpiles	0.00
7.2	093-281-29	Milan Capital	Stockpiles	7.68
7.2	093-281-30	Milan Capital	Creek, agriculture, disturbed area	0.0
7.2	093-281-31	Milan Capital	Agriculture & disturbed area	31.11

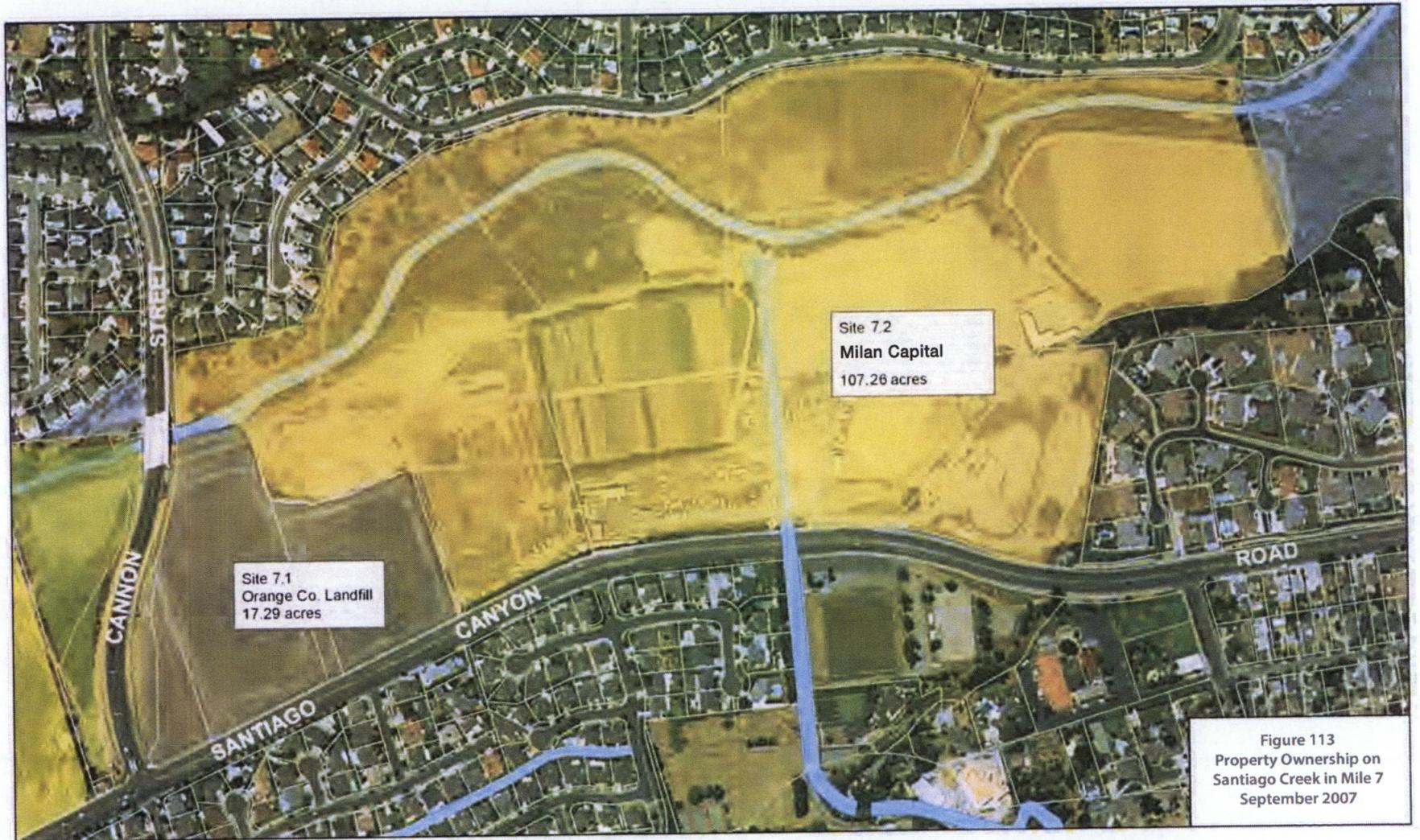


Figure 113
Property Ownership on
Santiago Creek in Mile 7
September 2007



Figure 114. Owlet Moth by Sam Stewart, © 2007 BonTerra Consulting, used with permission



Figure 116. Two-striped Garter Snake by Sam Stewart, © 2007 BonTerra Consulting, used with permission



Figure 115. Coastal California Gnatcatcher by Sam Stewart, © 2006 BonTerra Consulting, used with permission



Figure 117. Deerweed by Richard B. Lewis III, © 2004 BonTerra Consulting, used with permission

Table 18. Property Ownership in Mile 8

Site	A.P. Number	Land Owner	Current Use	Acres
8.1	093-280-16	OCFCD	Natural area (NCCP Reserve)	29.74
8.2	093-270-43	OCFCD	Portion of park	5.74
8.2	093-270-45	OCFCD	Portion of park	0.34
8.2	093-250-37	OCFCD	Portion of park	6.33
8.2	093-250-36	OCFCD	Portion of park	6.59
8.2	093-270-02	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.33
8.2	093-270-12	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.09
8.2	093-270-17	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.40
8.2	093-270-38	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.55
8.2	093-270-44	OC PFRD OC Parks	Santiago Oaks Reg. Park	17.06
8.2	093-270-46	OC PFRD OC Parks	Santiago Oaks Reg. Park	8.14
8.2	093-270-52	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.14
8.2	093-270-53	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.02
8.2	093-270-08	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.17
8.2	093-250-04	OC PFRD OC Parks	Santiago Oaks Reg. Park	14.36
8.2	093-250-06	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.00
8.2	093-250-07	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.00
8.2	093-250-08	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.00
8.2	093-250-38	OC PFRD OC Parks	Santiago Oaks Reg. Park	8.25
8.2	093-250-39	OC PFRD OC Parks	Santiago Oaks Reg. Park	23.92
8.2	093-250-40	OC PFRD OC Parks	Santiago Oaks Reg. Park	16.24
8.2	093-250-41	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.03
8.2	093-250-42	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.32
8.2	093-250-43	OC PFRD OC Parks	Santiago Oaks Reg. Park	0.06
8.2	085-551-08	OC Real Property	Open space slope	0.38
8.2	085-551-10	OC Real Property	Open space slope	1.64
8.2	085-551-11	OC Real Property	Open space slope	0.30
8.2	085-551-51	OC PFRD OC Parks	Santiago Oaks Reg. Park	70.20
8.2	085-551-52	OC Real Property	Open space slope	11.37
8.2	085-581-67	OC PFRD OC Parks	Santiago Oaks Reg. Park	9.30
8.2	085-581-69	OC PFRD OC Parks	Santiago Oaks Reg. Park	4.40
8.3	093-270-63	Masood Trust	Residence (slope)	6.60
8.4	093-250-48	Danny & Billie Letner	Residence (slope)	1.00

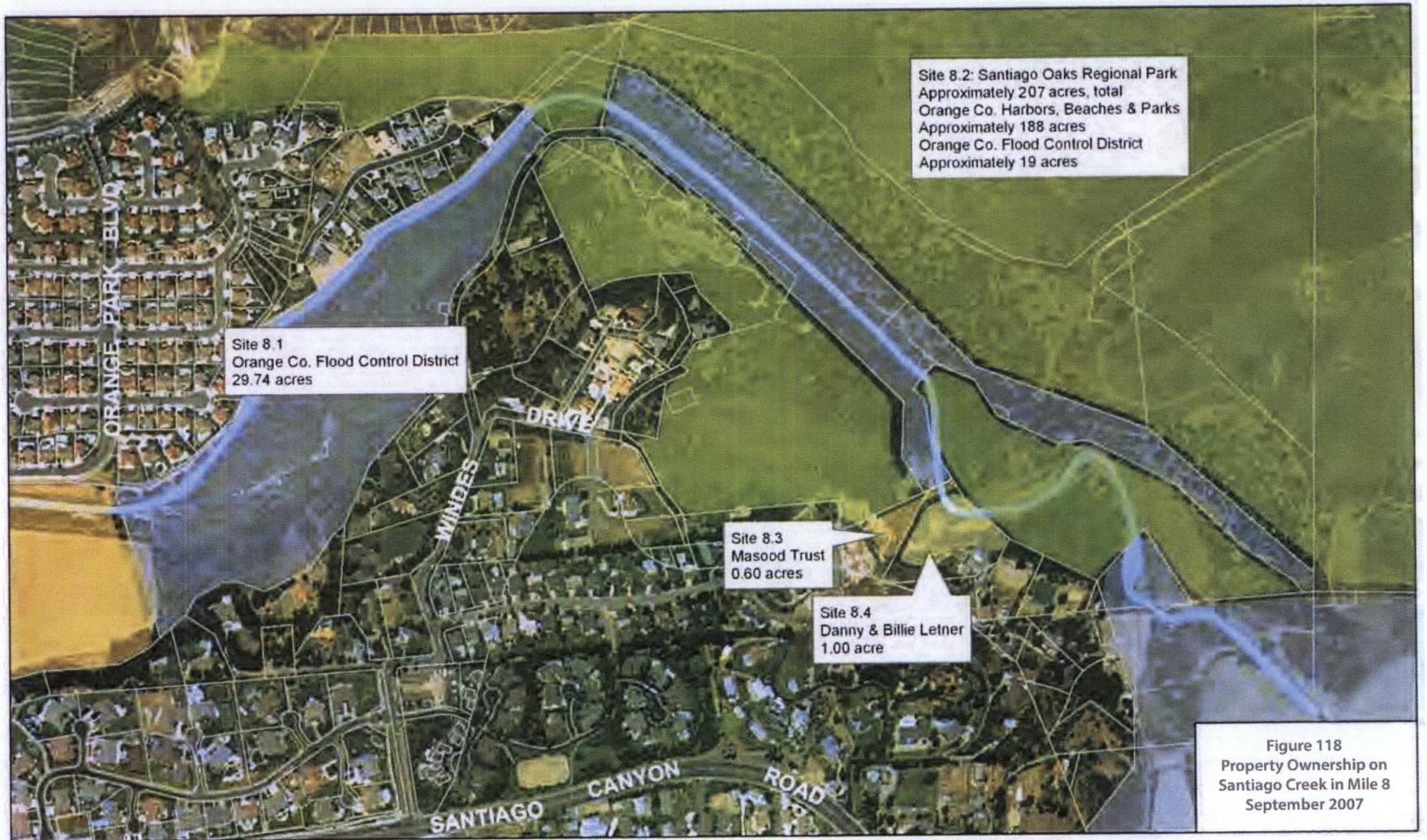
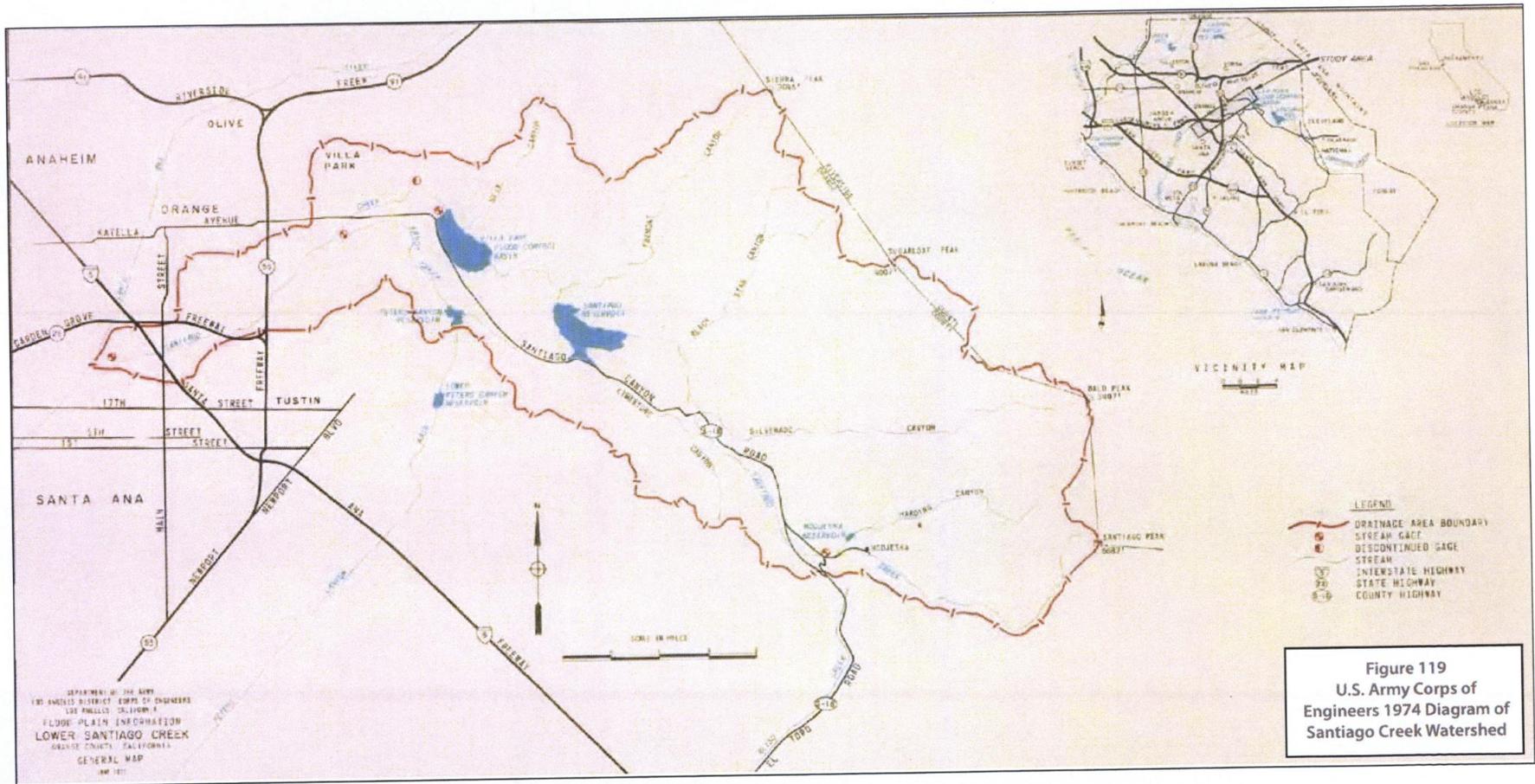


Figure 118
 Property Ownership on
 Santiago Creek in Mile 8
 September 2007



4.3. GEOGRAPHY OF THE CREEK

Santiago Creek is Orange County's largest single tributary of the Santa Ana River. The watershed (or overall drainage area) is almost entirely located within Orange County, beginning in the rugged Santa Ana Mountains and Cleveland National Forest, with less than one percent of the basin located in unincorporated Riverside County. The watershed's highest, northeasterly rim is crested by the most prominent peaks of the mountains, peaks that represent points along which the county boundary was drawn: Sierra Peak (3045 feet above sea level), Sugarloaf (4007), Bald (3497) and Santiago (5687). A northwesterly ridge is formed by the Peralta Hills, which have become more commonly known as Anaheim Hills and Orange Hills since their development. The watershed's southwesterly rim is formed by Lomas Ridge, which divides planning areas for the Cities of Orange and Irvine. The location and watershed of Santiago Creek is shown in Figure 62 (U.S. Army 1973).

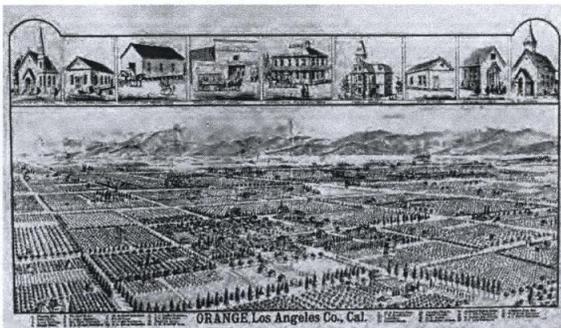


Figure 120. An Aerial Rendering of Orange Created in 1886, courtesy of Orange Public Library

The Santiago Creek watershed includes a drainage area of approximately 102 square miles. Dry or low-volume tributaries of Santiago Creek include Handy Creek, Weir, Fremont, Black Star, Silverado, Harding, Modjeska, and Limestone Canyons. The landscape is mountainous with native habitat comprising oak woodlands, riparian forests, chaparral and coastal sage scrub, and grasslands. The uppermost reaches of the watershed are owned by the federal government and managed by the U.S. Forest Service, as part of Cleveland National Forest. Residential communities exist in canyons of the Santa Ana Mountains, while approximately 28,000 acres are owned by a single land owner and development company.

The lower reach extends from Villa Park Dam to the creek's confluence with the Santa Ana River, dropping in altitude from 470 feet to 106 feet above sea level over a span of seven miles through the urbanized City of Orange (U.S. Army 1973). Below the dam, the creek flows through a narrow streambed in Santiago Oaks Regional Park. The creek soon reaches an alluvial fan upon which the northeastern portion of the City of Orange was developed, where a "vast deposit of high quality sand and gravel" existed along the streambed. These deposits were mined extensively over the course of 85 to 125 years by commercial interests (U.S. Army 1988). The creek reaches the coastal plain of Orange County and its confluence with the Santa Ana River, now fully developed with urban and suburban land uses.

Large land areas in the upper watershed have been preserved as permanent open space including Weir Canyon and Black Star Canyon Wilderness Parks and Limestone Canyon (County of Orange 2002). In 2002, the Orange County's largest landowner announced that 35,000 additional acres will be set aside as open space (The Irvine Company 2003).

Two dams were built on Santiago Creek. Santiago Dam and Santiago Reservoir (now known as Irvine Lake) were constructed by The Irvine Company in 1933. The reservoir was originally built as a water supply facility, but is now used for recreational purposes as well. Villa Park

Dam, located just upstream from the study area, was built by the Orange County Flood Control District in 1963 as a rock and earth structure to protect agricultural uses and urban development in the flood plain. Together, the two dams control storm water runoff from 80 percent of the watershed. The project area serves as the only drainage collector for approximately 19 square miles below Villa Park Dam (U.S. Army 1988).

The gravel pits located in or adjacent to the creek between Cannon Street and Bond Avenue were excavated to a depth of 150 feet. They were subsequently adapted for use as groundwater recharge basins and served to retard the flow and velocity of the creek during heavy rains. Additionally, Upper Peters Canyon Reservoir located on Handy Creek at the southern rim of the watershed, can release flows into Handy Creek, or divert its waters south into the San Diego Creek watershed via Peters Canyon Wash.



Figure 121. The Creek Flows across Bedrock near Cannon Street



Figure 122. Chalk Dudleya by Richard B. Lewis III, © 2004 BonTerra Consulting, used with permission



Figure 123. Bladderpod by Richard B. Lewis III, © 2004 BonTerra Consulting, used with permission



Figure 124. California Towhee by Richard B. Lewis III, © 2003 BonTerra Consulting, used with permission

4.4. NATURAL RESOURCES

Although little of the historically natural landscape remains within the study area, natural conditions in the watershed were documented in past planning efforts. At several locations, upper reaches of Santiago Creek remain undisturbed. Moreover, the waterways of southern California coastal plains have similar hydrologic, geological and biological characteristics, supporting natural communities comprising individual species that may be reintroduced to urban sections of Santiago Creek.

Planning documents dating over the past 30 years described the natural resources of Santiago Creek, assumed to have been more plentiful before the era of increased urban development, especially in upstream locations.

The original vegetation of the East Orange area before the advent of western man was clearly dominated by coastal sage scrub communities with riparian vegetation along Santiago Creek. Today, however, much of the original vegetation structure has been altered by human activities. From a regional standpoint, present biotic communities of East Orange do not represent outstanding habitats in comparison to other areas of Orange County. Nevertheless, the extensive open space and biotic community structure provides important wildlife habitat (East Orange Planning Committee 1975).

The native plant species of Santiago Creek are listed in Table 19, while animal species that were identified in 1975 (ibid) are listed in Table 20.

Table 19. Plant Species Native to Santiago Creek					
Coastal Sage Scrub		Annuals and herbaceous perennials		Riparian Forest	
<i>Artemisia californica</i>	Coastal Sagebrush	<i>Phacelia hispida</i>	Caterpillar Phacelia	<i>Quercus agrifolia</i>	Coast Live Oak
<i>Eriogonum fasciculatum</i>	Wild Buckwheat	<i>Brodiaea pulchella</i>	Blue Dicks	<i>Juglans californica</i>	California Walnut
<i>Rhus laurina</i>	Laurel Sumac	<i>Bloomeria crocata</i>	Golden Bloomeria	<i>Salix</i>	Willow
<i>Salvia mellifera</i>	Black Sage	<i>Allium sp.</i>	Wild Onion	<i>Baccharis viminea</i>	Mulefat
<i>Opuntia occidentalis</i>	Prickly Pear Cactus	<i>Sisyrinchium bellum</i>	Blue-eyed Grass	<i>Artemisia douglasiana</i>	Mugwort
<i>Sambucus mexicana</i>	Mexican Elderberry	<i>Cryptantha intermedia</i>	Clearwater Catseye	<i>Typha latifolia</i>	Cattail
<i>Encelia californica</i>	Bush Sunflower	<i>Plagiobothrys sp.</i>	Popcorn Flower		
<i>Galium augustifolium</i>	Bedstraw	<i>Convolvulus cyclostegius</i>	California Morning Glory		
<i>Salvia apiana</i>	White Sage	<i>Lupine sp.</i>	Lupine		
<i>Diplacus aurianticus</i>	Bush Monkey Flower	<i>Orthocarpus purpurescens</i>	Owls Clover		
<i>Opuntia prolifera</i>	Cholla	<i>Castelleja affinis</i>	Indian Paint Brush		
<i>Lotus scoparius</i>	Deerweed	<i>Eschscholzia californica</i>	California Poppy		
<i>Heteromeles arbutifolia</i>	Toyon	<i>Hemizonia</i>	Spikeweed		
<i>Rhus integrifolia</i>	Lemonadeberry	<i>Holocarpa Stephanomeria</i>	Tarweed		

Table 20. Animal Species Native to Santiago Creek			
Birds		Mammals	
<i>Calypte anna</i>	Anna's Hummingbird	<i>Microtus californicus</i>	Meadow Vole
<i>Carpodacus mexicanus</i>	House Finch	<i>Mus musculus</i>	House Mouse
<i>Passer domesticus</i>	House Sparrow	<i>Thomomys bottae</i>	Botta Pocket Gopher
<i>Zonotrichia leucophrys</i>	White Crowned Sparrow	<i>Neotoma lepida</i>	Desert Wood Rat
<i>Campylorhynchus brunneicapillus</i>	Cactus wren	<i>Dipodomys agilis</i>	Pacific Kangaroo Rat
<i>Pipilo crissalis</i>	California Towhee	<i>Perognathus fallax</i>	San Diego Pocket Mouse
<i>Aphelocoma californica</i>	(Western) Scrub Jay	<i>Peromyscus maniculatus</i>	Deer Mouse
<i>Zenaida macroura</i>	Mourning Dove	<i>Peromyscus eremicus</i>	Cactus Mouse
<i>Mimus polyglottos</i>	Mockingbird	<i>Microtus californicus</i>	California Meadow Mouse
<i>Sturnella neglecta</i>	Western Meadowlark	<i>Reithrodontomys megalotis</i>	Western Harvest Mouse
<i>Callipepla californica</i>	California Quail	<i>Sylvilagus audubonii</i>	Audubon Cottontail Rabbit
<i>Geococcyx californianus</i>	(Greater) Roadrunner	<i>Otospermophilus beecheyi</i>	Beechey Ground Squirrel
<i>Lanius ludovicianus</i>	Loggerhead Shrike	<i>Lepus californicus</i>	Black Tailed Hare
<i>Elanus leucurus</i>	White-tailed Kite	<i>Spilogale putorius</i>	Spotted Skunk
<i>Circus cyaneus</i>	Marsh Hawk (Northern Harrier)	<i>Mephitis mephitis</i>	Striped Skunk
<i>Buteo jamaicensis</i>	Red-tailed Hawk	<i>Urocyon cinereoargenteus</i>	Gray Fox
		<i>Mustela frenata</i>	Long-tailed Weasel
		<i>Didelphis marsupialis</i>	Opposum (non-native)
		<i>Canis latrans</i>	Coyote
		<i>Odocoileus hemionus</i>	Mule Deer (rarely present)
		<i>Lynx rufus</i>	Bobcat (rarely present)

In mitigating impacts of the Army Corps of Engineers project, the species of trees and shrubs shown in Table 21 were recommended for the publicly-owned right-of-way of Santiago Creek (U.S. Army 1988: Section 14.05). This plant selection is perhaps drawn from institutional knowledge of the broader range of riparian ecosystems in Southern California.

Prior local agency planning documents do not address fish life in Santiago Creek, generally regarded as an arroyo, perennial stream or "dry creek." Yet before the community's modern history of agriculture and urbanization, it is likely that interconnected wetlands supported significant populations of native fish, with Santiago Creek being a key migratory passage in the rainy season. Before the watershed was developed, wetlands were scattered widely across the flood plain of the Santa Ana River, especially between the confluence of Santiago Creek and Santa Ana River, and the river's estuaries downstream.



Figure 125. Hollyleaf Redberry by Richard B. Lewis III, © 2005 BonTerra Consulting, used with permission

Trees		Shrubs	
<i>Platanus racemosa</i>	California Sycamore	<i>Cercocarpus betuloides</i>	Mountain Mahogany
<i>Populus fremontii</i>	Fremont Cottonwood	<i>Eriogonum fasciculatum</i>	Common Buckwheat
<i>Populus trichocarpa</i>	Black Cottonwood	<i>Lotus scoparius</i>	Deerweed
<i>Alnus rhombifolia</i>	White Alder	<i>Artemesia californica</i>	California Sagebrush
<i>Salix gooddingii</i>	Black Willow	<i>Encelia californica</i>	Desert Encelia
<i>Salix hindsiana</i>	Sandbar Willow	<i>Salvia apiana</i>	White Sage
<i>Salix laevigata</i>	Red Willow	<i>Salvia mellifera</i>	Black Sage
<i>Salix lasiolepis</i>	Arroyo Willow	<i>Artemesia dracunculus</i>	Dragon Sagewort
<i>Sambucus mexicana</i>	Mexican Elderberry		

Land reclamation practices, agricultural water diversions, and ground water extraction changed the surface of the watershed and generally reduced the amount of water available for fish habitat. Moreover, urbanization significantly lowered the water table to the extent that less ground water overflowed from springs or other sources into Santiago Creek. Several species of fish are commonly found in coastal waterways of southern California (McGinnis 1984, Minckley and Deacon 1991, Moyle 2002), so it is assumed that Santiago Creek once supported a number of indigenous species. Although the Steelhead is widely known to have resided in California's southern coastal rivers and streams, a number of smaller species were also prevalent (see Table 14).



Figure 126. Bush Sunflower by Richard B. Lewis III, © 2004 BonTerra Consulting, used with permission

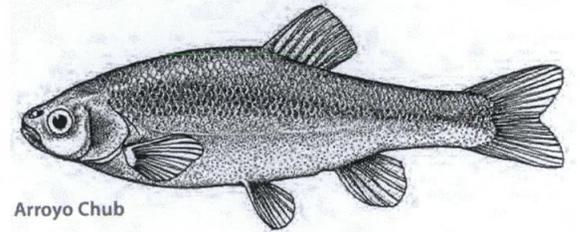


Figure 127. Many-stemmed Dudleya by Richard B. Lewis III, © 2002 BonTerra Consulting, used with permission

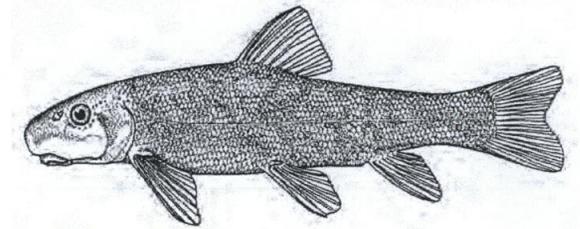
Now Extirpated	
<i>Gila orcutti</i>	Arroyo chub
<i>Rhinichthys osculus</i>	Speckled dace
<i>Gasterosteus aculeatus</i>	Threespine stickleback
<i>Catostomus santaanae</i>	Santa Ana sucker
<i>Oncorhynchus mykiss irideus</i>	Rainbow trout (Steelhead)



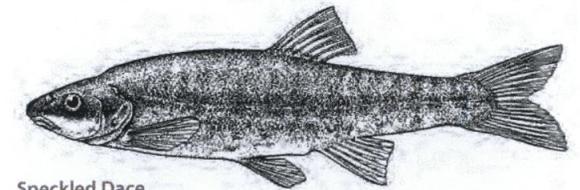
Figure 128. The Coastal Rainbow Trout (above) Begins Life in Freshwater Streams of Coastal California, Migrates to the Ocean, then Returns Upstream Late in its Life Cycle as the Steelhead (below), all images © 2002 University of California Press, used with permission



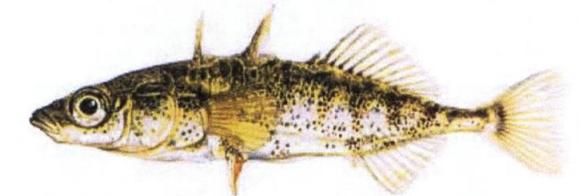
Arroyo Chub



Santa Ana Sucker



Speckled Dace



Threespine Stickleback

4.5. HISTORIC RESOURCES

Fifteen historic sites and structures are associated with Santiago Creek (Brigandi 2001). While most of the sites should be regarded as locally significant, one site may be eligible for listing on the National Register of Historic Places.

Portolá Expedition

On May 15, 1769, a party of soldiers and clergy left Baja California in New Spain, to begin the first overland expedition of Alta California. Fifteen weeks later, the party arrived at Santiago Creek and set up camp. The diary of Fray Juan Crespi includes the following passage (Brown 2001: 311-315; the word "heathens" was not intended as pejorative, but was generally used to describe the primitive, non-baptized persons whom the Spanish explorers encountered in "New Spain."):

July 27th. We set out early in the morning. It must have been six o'clock, very overcast and foggy. From the two small Saint Pantaleon Springs, following a due northwestward course over the same level here that we had started upon yesterday. This plain is a very large and spacious one, the nearest hills seen around it being three or four leagues away at the closest. In the distance we saw a great deal of trees. We could not, since we were viewing them from far away with the day being very overcast with fog, make out very well whether they must have been live oaks or not, but we judged they were so, with sycamore trees as well. The size of this flat is vastly great in leagues. The soil, all grass-grown with dry grasses, seems all very good. The bare mountain range that we are keeping upon our right to northward seems very grass-grown also, like everything we have found between San Diego and here. We noted a great scarcity of wood, since except at hollows there are very few trees to be seen. This plain [itself] seems to have a good deal of wood and stone. If this place can be dry farmed, its soil could support a city. We must have gone three hours and have made three leagues as well, without the level coming to an end.



Figure 129. Juan Gaspar de Portola led the first overland expedition of California by the Spanish military and clergy in 1769, San Diego Historical Society

We made camp close to a stream, which, while saying our prayers, Father Gómez and I have surveyed. It lies not far off from the camp within some trees. We saw the water, wherever allowed by the great many trees, the wild grapevines, rose bushes, tule-rush, and other plants, running in two or three spots. It is a very large stream. The water appears to have its source very close to where we saw it running, and its flow must not be over three quarter-yards deep. It seems to come down from the mountains upon the northeastward of this large plain, in which direction a great deal of sycamore, willow, and live-oak trees are seen running along. The water here flows through the midst of this large plain of apparently very good soil and of leagues in breadth and length. How far away the sea must be there is no telling.

We christened this grand, fine and lovely spot with the name Santiago Apóstol, Saint James the Apostle, Patron of the Two Spains. This spot, among all of those we have left behind, has the most amount of soil and most running water, trusting that this shall with time become a large mission. Having reached this spot, we saw no more than three or four heathens near where we made camp; however, there may be villages off in the distance, across the wide-stretching plain, as the plain is of great extent.

There was a stake weir, made by the heathens, at the water that we saw, by which they had it split into two large flows each taking its separate course in among the trees here. We did not venture to follow it along further, it being so overgrown, and we ourselves all alone. We saw some patches of cholla at this spot, none of these [cactus] plants having been seen since long before reaching San Diego. Since we set out from San Diego, no jojobas or mesal plants have been come upon. I took the north latitude at this spot, and it lies in 33 degrees, 36 minutes of latitude. The scouting soldiers set out to look for water, and from what we have gathered from the heathens here, we imagine they must have come across some rivers near by.

July 28th. We set out at six o'clock in the morning from this grand plain and watering place of Santiago, following the same northwestward course of these last days' marches, keeping on over this same plain along the skirts of the range we have been keeping to our right (to the north)...



Figure 130. The Creek Near the Approximate Site of Portola's Encampment on July 27, 1769, as it Appears Today

The following is a list of several sites where interpretive displays or kiosks could be installed along Santiago Creek, in sequence that follows the river's flow. The list summarizes historical sites only, and is not intended to be fully inclusive. A fully developed interpretive program might address natural resources, ongoing restoration efforts and other educational issues. Figure 134 is a map showing the location of the listed sites.

- A. Submerged dam at Santiago Oaks Regional Park; early water diversion project, circa 1890.
- B. Santiago Oaks vicinity: Camp Jotham Bixby, Orange County's first Boy Scout camp, circa 1921.
- C. Grijalva hide tanning vats on north side of creek, below Cannon St. bridge; remnant of the early cattle operations on Rancho Santiago de Santa Ana (largely destroyed by floods of 1916).
- D. Grijalva Adobe at Hoyt Hill, (east of the intersection of Hewes and Rancho Santiago Blvd., probably built shortly after 1800. The existing Victorian-era home was built on this site in 1887. A remnant of a rock wall foundation is all that remains of the Grijalva Adobe.
- E. Conrock and Blue Diamond (or Bond) Pits: the legacy sand and gravel mining and consequences for the creek, 1900-1980; adaptation as water recharge basins by Orange County Water District, 1990s.
- F. Southern Pacific Railroad, Tustin Branch bridge (north of Walnut); tracks laid in 1888 to reach fruit packing plants in agricultural era. Destroyed by flood in 1969.
- G. Site of the first orange grove in Orange (end of Walnut, north side of creek), planted circa 1872 by Patterson Bowers (1825-1898).
- H. Portolá expedition campsite near Grijalva Park (east edge of creek, one-half mile north of Chapman Avenue; exact site unknown): the first Spanish overland expedition in California, 1769. Party named it Santiago Creek, according to the diaries of Fray Crespi.
- I. Town site of McPherson, 1886; grapes were the primary local crop.

Figure 131. Masonry at Hart Park Displays Craftsmanship of the WPA Era

- J. Orange, McPherson & Modena Street Railway, crossing at Chapman Avenue first constructed for horse-drawn streetcar during the "boom" days of the 1880s (destroyed by flood in 1891).
- K. Flippen Ranch (Yorba Park)
- L. Santa Ana Valley Irrigation Company (SAVI) aqueduct through "Sycamore Crossing" (former Santiago Golf Course).
- M. William O. Hart Park, once known as Orange City Park, the first municipal park. Hart was editor of the Orange City News. Rockwalls built in creek by WPA. Park was home to the Lionettes, a women's softball team.
- N1. Chinatown (north side creek, just below Glassell St.); early 1890s until early 1920s. Lower end of Gardner family ranch.
- N2. Indian campsite (same general area). Relics found by Garner family, who established ranch on site in 1875.
- O. (Entire creek) Major flood events: 1825, 1861-62, 1884, 1916, 1938, 1969.



Figures 132 and 133. Then and Now: The Southern Pacific Railroad Trestle Spans Santiago Creek (Left) in 1949, and the Site of the Crossing (Above) after Recent Improvements to Creek

4.6. FLOOD PROTECTION

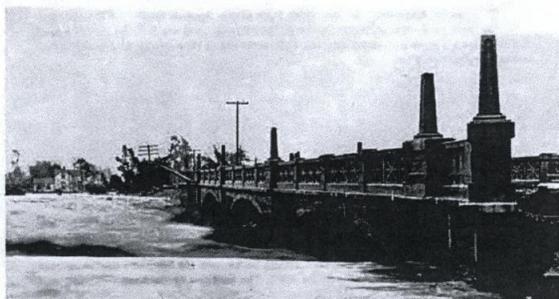


Figure 138. Chapman Avenue Bridge Spans Santiago Creek During the Flood of 1916, Orange County Public Library

Significant winter rains have overwhelmed Santiago Creek's channel capacity and damaged property in 1810, 1825, 1862, 1884, 1889, 1916, 1927, 1938, 1943, 1969 and 1980. (U.S. Army 1973 and 1990) Historic records indicate that the 1810 flood destroyed many local adobe structures in what is now Orange County, while the 1825 flood was severe enough to change the course of the Santa Ana River. In 1862, much of Orange County was turned into an inland sea after rains fell continuously for a period of 21 days. News accounts indicate that floods after 1884 repeatedly left the flood plain under water. In 1884, overflows of Santiago Creek nearly reached the location of the Orange Plaza. Rail service was interrupted for a period of six weeks, leaving the former portion of Los Angeles County isolated from the seat of local government, and giving impetus to incorporation of cities and the formation of an independent Orange County in 1889.

In January, 1916, "all of Orange County from Olive to the ocean and from the foothills of the Santa Ana Mountains... to Long Beach became a deep sea of muddy water" (U.S. Army 1973, quoting T.B. Talbert: pg. 28). Four people died and property damage estimates were half a million dollars. "Santiago Creek reached a floodstage never

before recorded... Bridges caught debris in the water and formed great dams. When they broke, bridges, railroad tracks, orchards and homes were carried away."

Santiago Creek overflowed its banks toward the south at McPherson Street, and west at Chapman Avenue. "Most bridges were pile bridges and debris piled up. Debris piled up against the Tustin [Street] bridge and floodwaters went down Tustin [Street] through orchards east of Santa Ana. Dynamite was used to dislodge the debris. There was erosion at new Orange [now William O. Hart] Park" (Ibid., quoting Terry Stephenson: 28-29).

A storm in February 1927 destroyed four local bridges and two homes in Santa Ana, which were undermined and washed into Santiago



Figure 139. The Santiago Boulevard Crossing of Santiago Creek at Sand Pits Downstream from Cannon Street, After a Flood in 1969, Orange County Public Library



Figure 140. House at the End of Walnut Avenue Undermined by Flood Waters in Santiago Creek, 1969, Orange County Public Library

Creek. In a six-day period at the beginning of March, 1938, storms caused flooding of 182,300 acres in the Santa Ana River basin, and 34 people died. However, the peak flow of Santiago Creek was reduced by recent construction of Santiago Dam, and property adjacent to the creek suffered less damage than might otherwise have occurred. In January and February, 1969, a combination of powerful rains and growing urbanization resulted in the most destructive flood to date, when Orange County was declared a national disaster area.

The largest peak outflow from Santiago Reservoir since its construction in 1933 occurred... By February 25, the reservoir of Villa Park Dam had filled to capacity for the first time since its construction in 1963, as a maximum inflow of 11,000 cfs occurred. Although the outlet conduit was discharging up to 4,000 cfs, spillway overflow occurred at 1:30 P.M. and continued for the next 36 hours. The maximum peak outflow from the dam reached 6,000 cfs Although the

Table 23. Discharge Rates for Flood Protection Structures on Santiago Creek at Peak Design Flows in 1973

Point of Concentration	Drainage Area (square miles)	Design Discharge (ft ³ /sec.)
Santiago Dam (at Irvine Lake)	63	6,200
Villa Park Dam	84	5,600
Handy Creek	3	820
Villa Park Road	91	5,600
Outlet from OCWD recharge basins	95	3,500
Walnut Avenue		3,700
Chapman Avenue	97	3,900
Tustin Street		4,200
Garden Grove Freeway	101	4,500
Santa Ana Freeway		4,700
Confluence with Santa Ana River	102	5,000

safety of the dam was never threatened, this outflow caused serious erosion downstream in the Cities of Orange and Santa Ana.

The Santiago Boulevard culverts were destroyed and floodwaters poured into gravel pits in the riverbed... Portions of parks and a golf course in the streambed were inundated. Trees, houses, apartments, gardens, swimming pools, and bridges were torn away by erosion. Up to 30 feet of lateral erosion occurred along the Santiago Creek channel. Numerous people, including many volunteers, worked around the clock to remove debris, sandbag eroding embankments, cordon off dangerous zones, issue warnings and make temporary

repairs. U.S. Marine Corps helicopters flew in junked cars that were dropped along the banks of the creek... to prevent further undermining of houses. Dynamite was used to clear out trees and debris in the creek. A Southern Pacific Railroad bridge, water and sewer lines, a pedestrian overcrossing and three roads washed out. About 2,000 Orange residents were evacuated from homes bordering the creek (U.S. Army Corps of Engineers 1973: 36).

Peak flows of Santiago Creek have been estimated at 6,000 cubic feet per second (in 1884 and 1969), and 12,000 cfs in 1916, to 16,000 cfs in 1884 (Ibid.: pg. 26).

An Army Corps of Engineers preliminary study of Santiago Creek concluded that floods of equal or greater magnitude than those that have occurred in the past may occur in the future. An "Intermediate Regional Flood" (or 100-year flood) and "Standard Project Flood" were modeled and evaluated. The U.S. Army Corps of Engineers study determined that topographic, meteorologic and hydrologic conditions in the watershed could result in inflows of 10,400 to 17,000 cubic feet per second at Villa Park Dam, and that maximum releases from the dam might result in future "breakouts" (overflows of the creek's channel) at multiple locations in Orange and Santa Ana (Ibid.: pg. 44).

An intermediate regional or standard project flood along the study reach would result in inundation of residential, commercial, agricultural, and recreational lands.

Deep floodwater flowing at a high velocity and carrying floating debris would create conditions hazardous to persons and vehicles attempting to cross flooded areas. In general, floodwater 3 or more feet deep and flowing at a velocity of 3 or more feet per second (about 2 miles per hour) could sweep a person off his feet, thus creating definite dangers of injury or drowning. Rapidly rising and swiftly flowing floodwater might trap persons in homes that are ultimately destroyed or in vehicles that are ultimately submerged.

OVERFLOW AREA FROM FLOOD OF 1916

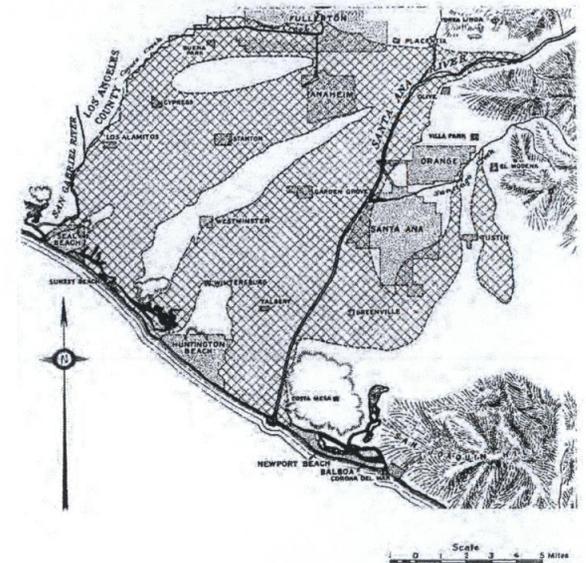


Figure 141. Area inundated by the Santa Ana River and Santiago creek during the flood of 1916, Orange County Flood Control District, 1931

Decaying flood-deposited garbage or other organic material could create health hazards. Further health hazards could result from ruptured water supply or sewer lines. Isolation of developed areas by floodwater could create hazards in terms of medical, fire, or law enforcement emergencies. An additional hazard is the erosive and depositional character of the floods. Streambanks could be eroded away and this material deposited some distance downstream (U.S. Army 1973: 44-46).

Santiago Creek was studied more thoroughly in 1988, as part of a comprehensive analysis of the Santa Ana River. In addition to the volumes of reservoir storage behind Santiago and Villa Park Dams, gravel pits located on the creek were determined to provide additional storage for 12,000 acre feet of water (U.S. Army 1988: Section 2.02).

These pits are well entrenched and form an effective flood control reservoir which could retain the entire volume of small floods, preventing streamflows from overflowing and causing damage to downstream properties. However, the flood control value of these pits decreases as soon as they are partially or completely filled...

In the mid 1990s the Orange County Water District acquired the gravel pits between Bond Street and just north of Villa Park Road to develop a ground water recharge facility on Santiago Creek. To help implement the flood protection project, the water district agreed to stabilize the steep slopes of the pits and improve "transition structures" and spillways associated with roadways at the upstream portion of and outlet for the basin (Ibid., Section 2.16). The water district will regulate recharge waters so that the top of the pool does not exceed 274 feet above sea level in the rainy season. The uppermost 24 feet of the reservoir is reserved for flood protection purposes. The below-grade reservoir will have a flood water "storage allocation" of 4,620 acre-feet in the elevation range between 274 feet and 298 feet above sea level.

A portion of this storage may be used for water conservation depending on the season of the year. That is, the amount of storage above elevation 274 reserved for flood control only, may vary with the time of the year... Santiago Creek Reservoir flood control storage will be used to control discharge in Santiago Creek from the pits to the confluence with the Santa Ana River so that outflow from the pits when combined with runoff from the drainage area downstream will not exceed the design discharge of Santiago Creek, which is 5,000 cubic feet per second at the mouth (Ibid., Section 15.01).

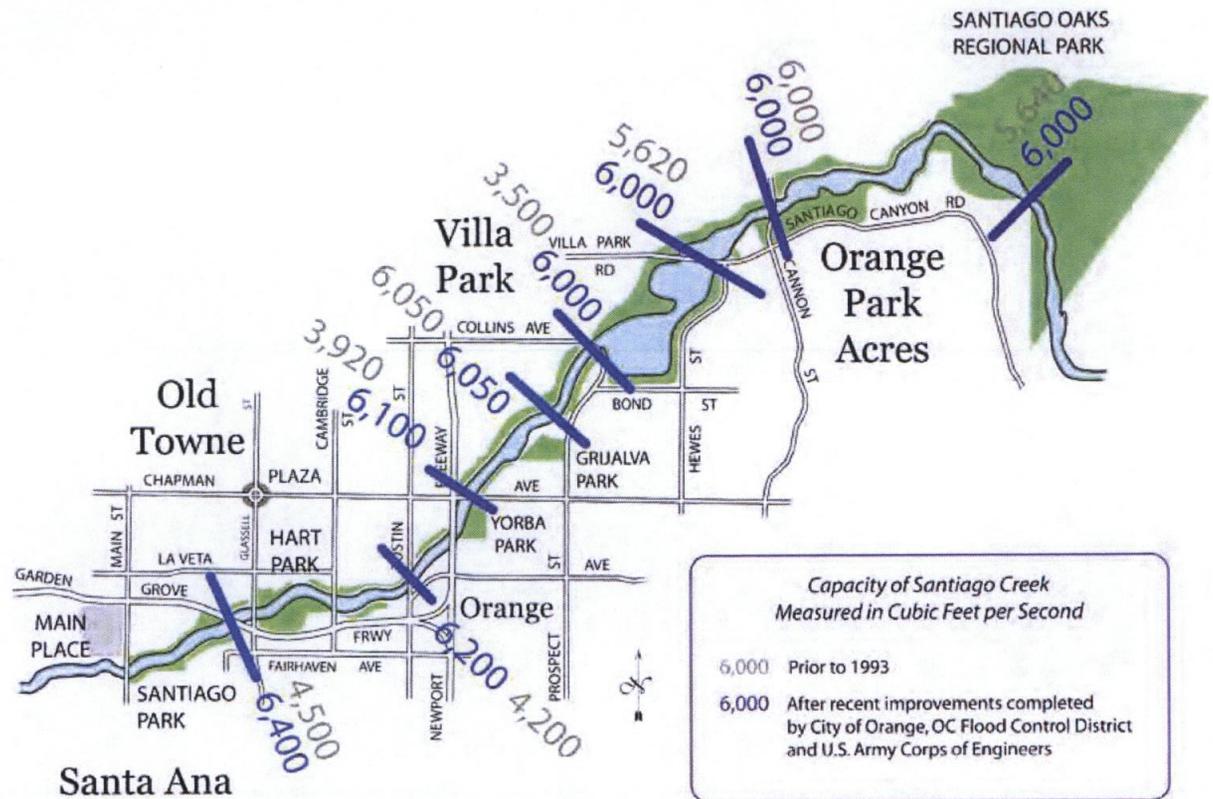


Figure 142. The Capacity of Santiago Creek has Improved as City and County Officials Cooperate with the U.S. Army Corps of Engineers

Lower reaches of the creek include extensive flood protection structures, such as cobblestone and concrete walls and lined channels constructed for stream bank protection in the 1930s and later. Bridges, residential and institutional projects, including a city park, were developed as independent land improvement projects and incremental changes to the creek as the community continues to develop. The Army Corps of Engineers determined that conditions on Santiago Creek are adequate in the event of another "100-year storm," such as the 1969 flood. However, a more intensive storm would result in volume of storm water runoff exceeding the limited capacity of the creek, causing erosion where banks are not protected. The creek could undermine and destroy residentially- and commercially-developed property and change course as flood waters overtopped the channel flowed across a broader part of the community (Ibid., Section 2.17).



Figure 143. Santiago Creek Upstream from the Chapman Avenue Bridge

At the conclusion of the study conducted by the Army Corps and its local project sponsor, Orange County Flood Control District, three improvement projects were proposed for Santiago Creek: (1) modify the gravel pits to allow increased storage between Villa Park Road and Bond Avenue, now consolidated and owned by Orange County Water District; (2) construct an outlet structure from the gravel pits with a release capacity of 3,500 cubic feet per second; and (3) construct a rip-rapped channel on a portion of Santiago Creek in the City of Santa Ana, outside the project area (U.S. Army 1988: Section 2.18).

The U.S. Army Corps of Engineers designed an outlet structure that would release storm water from the OCWD recharge basin at the rate of 3,500 cubic feet per second. Santiago Creek was studied as part of the corps' Santa Ana River watershed project, when the need for this project was determined. At this point in time, funding is not yet appropriated in the federal budget for this component in the ongoing implementation of this regional project.

With the combination of existing and planned structures, the flow of Santiago Creek is regulated so that it will generally manage a flow of 6,200 cubic feet per second (cfs) before flood waters overtop its channel. In order to accommodate sheet flow and the input of storm drain outlets between flood "control" structures, each structure is designed to release smaller volumes (as shown in Table 15).

Contributing drainage areas for each structure are also shown in Table 15 (U.S. Army 1988: Section 3.05). The flood protection strategy is to use the OCWD recharge basins for interim storage, a buffer that will reduce a potentially destructive discharge of 5,600 cfs from Villa Park Dam to 3,500 cfs at the outlet of the OCWD Recharge Basin (Ibid., Section 4.02). It should be emphasized that flood protection projects are not intended to prevent an overtopping of the banks and localized flooding on Santiago Creek beyond a 100-year event. A larger storm (expressed as 200, 500, or 1,000-year storms) would exceed the creek's design capacity and wreak extensive damage to the community.

The overall hydraulic evaluation of the creek assumed that "considerable vegetation" would remain within unimproved, soft-bottomed, or natural areas and along embankments (Ibid., Sections

4.39 and 4.42). Since the flood protection project was isolated to discrete projects at the former gravel pits and the creek's downstream reach at the confluence, landscape mitigation requirements were limited. OCWD property was described as including "a substantial stand of native and riparian vegetation." Landscaping plans would not be prepared for the pits; however, native plants were to be used along the edges of the outlet or overflow structure, but only within right of way acquired for the project. In Santa Ana, a landscape plan was to be implemented to "minimize the detrimental visual effects of the flood control project," concrete and rip-rap channel and chain link fences, from nearby properties (Ibid., Sections 14.01 through 14.04).

The overall cost of the Santa Ana River flood protection project was valued in 1977 dollars at \$720 million, not counting the planning work that had already been completed to date. Although the U.S. Army Corps of Engineers regarded the abatement of flooding threats in the Santa Ana River basin as its greatest priority and by 2007 the planned improvements there had been completed. Santiago Creek improvements however, have been delayed considerably.



Figure 144. Ducks Wade in the Waters of Santiago Creek

4.7. LANDFILLS ALONG THE CREEK

Naturally occurring sand and gravel deposits along Santiago Creek encouraged mining activities between 1930 and 1990, leaving several open pits. Typically operated by private contractors, these pits were formed as resources were extracted, sold and used in construction of roadways, concrete structures and building materials. Many of these pits were later operated as public and private landfills, filled with household refuse, green waste, and inert materials (County Sanitation Districts of Orange County 1996). Other pits were filled with unknown materials and developed with urban uses, including mobile home parks and other medium-density residential developments (McClanahan 2001). Table 16 identifies 10 closed landfills along Santiago Creek and indicates their location.

As recently as 1977, county supervisors were being urged to consider new waste disposal facilities as landfills in sand and gravel pits along Santiago Creek. Three sites were recommended to the county's General Services Agency by a county Sand and Gravel Committee: Bond and Smith Pits, now owned by Orange County Water District, consolidated and operated as ground water recharge basins, and the Hurwitz-Bucheim Pit on the south side of the creek, between Santiago Boulevard and Cannon Street. Although the upper two pits (Smith and Hurwitz-Bucheim) were recommended for backfill with inert or non-organic materials, the Bond Pit was proposed as a future refuse or municipal waste disposal site, upon the completion of mining operations in effect at the time (County of Orange 1977: 27).

Table 24. Known Landfills on Santiago Creek

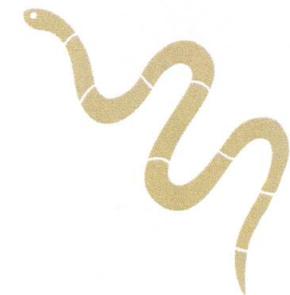
Landfill Name	Location	Present Status
Villa Park	NE corner, Santiago Cyn. Rd. at Cannon St.	Clean Closed
Hurwitz	NE corner, Santiago Cyn Rd. at Old Santiago Blvd.	Undetermined
Reeve & Toral	NW corner, Santiago Cyn. Rd. at Old Santiago Blvd.	Developed/private school
Orange City No. 11	SE side of creek, at Grijalva Park	Undetermined
Orange City No. 9	SE side of creek, north of Chapman, west of Malena	Undetermined
Yorba Park	SW corner, Chapman and Yorba	Undetermined
La Veta (YMCA)	East side of creek, north of Palmyra	Developed/youth center
La Veta	All land between creek, La Veta and S.R. 55	Developed as mobile home park
Orange City No. 4	"Sycamore Crossing" – Van Daele Homes	Clean Closed
Hart Park	South edge of park, along S.R. 22	Developed/park

Adaptive Uses of Other Open Pits

Some former sand and gravel pits were reclaimed for other uses. In some cases, land developers removed organic materials and re-filled pits with inert matter, building housing tracts known as "Rock Creek Ranch," "Sycamore Crossing," and "Morningside on the Lake." These three developments include structures that protect the adjacent development from erosion, and trail improvements that will provide useful links in building a continuous recreation trail along the edge of the creek.

OCWD Facility

Perhaps the most significant adaptation of a quarry on the creek occurred in 2000, when Orange County Water District converted Smith, Blue Diamond and Bond Pits into a ground water recharge facility. The facility gives OCWD the ability to store surface water in a reservoir operated to percolate into the soil and release water downstream, producing a continuous flow of 15 cubic feet per second below a spillway at Collins Avenue. In addition, water supplies at this location are augmented by a diversion of Santa Ana River water and waters imported by Metropolitan Water District. Orange County Flood Control District has an easement that provides for additional storm water on the surface. OCWD now owns 273 acres and is one of the major landowners in the Santiago Creek study area.





5.0 Appendices

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GLOSSARY

Class I Bikeway (Bike Path)

A separated right-of-way for exclusive use of bicycles and pedestrians. A two way bike path will have a minimum paved width of 2.4 meters (8 feet) with a minimum 0.6 meters (2 feet) wide graded area adjacent to the pavement.

Class II Bikeway (Bike Lane)

A striped lane for one-way bike travel on a street or highway.

Greenway

A linear park or open space established along a natural corridor such as a river or creek or along a railroad right-of-way.

Ground Water Recharge

The process by which surface water percolates through soil into an underground water table.

Recreation Trail

An unpaved general purpose trail suitable for use by bikers, hikers or equestrians.

Restoration

Relative to plant species in an area, the process of removing non-native plants and replacing them with natives.

Riparian

Pertaining to land adjacent to a river, creek, lake or pond.

Soilcrete

A mixture of cement and soil with structural properties similar to concrete and the appearance of sandstone.

Upland

The area above and immediately adjacent to the banks of a river or creek.

Watershed

The total area drained by a river or creek.

