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18 years of restoration on Codornices Creek

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Author

Fullmer, Chris

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LA 227 Rivers and Streams Restoration

Chris Fullmer

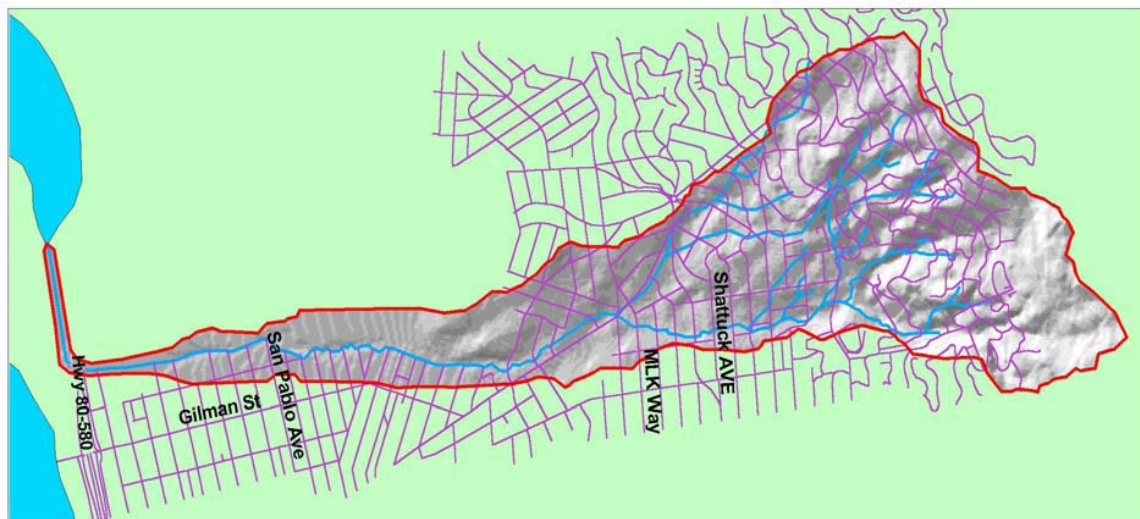
Abstract

Many restoration projects have taken place on Codornices Creek. This paper briefly compares Codornices Creek to Alameda Creek, another creek found in the East Bay area, to demonstrate that Codornices Creek is very well funded, even though it is a considerably smaller and less important creek than Alameda Creek. It then chronologically documents the goals, funding, and monitoring status of the known projects that have taken place on Codornices Creek. Through this study, the author is able to show that the scope of restoration projects occurring in the Codornices watershed have changed over time and have become increasingly complex and comprehensive and also that as projects are completed successfully, greater funding and support will follow.

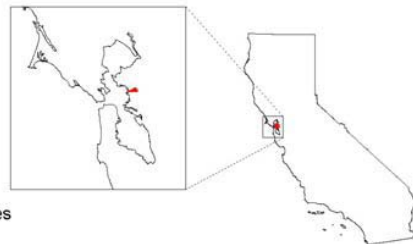
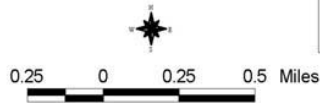
Introduction

Codornices Creek originates from a spring in the hills of Berkeley, California. It runs west through Berkeley until it reaches the city of Albany. The creek continues west and defines the border between the cities of Berkeley and Albany. The creek runs 2.9 miles, and the watershed drains an area of approximately 1.1 square miles (Codornicescreekwatershed.org) (Figure1).

Figure .1



Codornices Creek Watershed Location



Source: UrbanCreeks.org

A Comparison of Nearby Watersheds – Codornices and Alameda Creek

Codornices Creek is unusual in that it is highly funded for its size and has had many restoration projects in a fairly short amount of time. This is why I decided to study Codornices. To understand this better, I compared the known funding in dollars on the Codornices Creek to the known funding for Alameda Creek, another East Bay region Creek.

Alameda Creek covers 1/3 of the land of the East Bay, approximately 700 square miles. The Alameda County Water District has been awarded approximately 2.5 million dollars in restoration projects that have occurred on Alameda Creek (email correspondence with Jeff Miller of Alameda Creek Alliance, December 2008). Worked out in dollars per square mile, Alameda Creek comes out at \$3,500 of restoration per square mile of watershed.

As shown previously, Codornices Creek has a watershed of just over 1 square mile. It has received over 3 million dollars in funding. This comes out at \$3 million dollars per square mile of watershed. This is approximately 850 times more funding than Alameda Creek per square mile.

This discrepancy in funding led me to study the projects on Codornices Creek to understand who is doing these projects, where are they getting funding, why do they keep getting funding, and is there anything useful to learn from Codornices Creek and their success.

Figure 2.

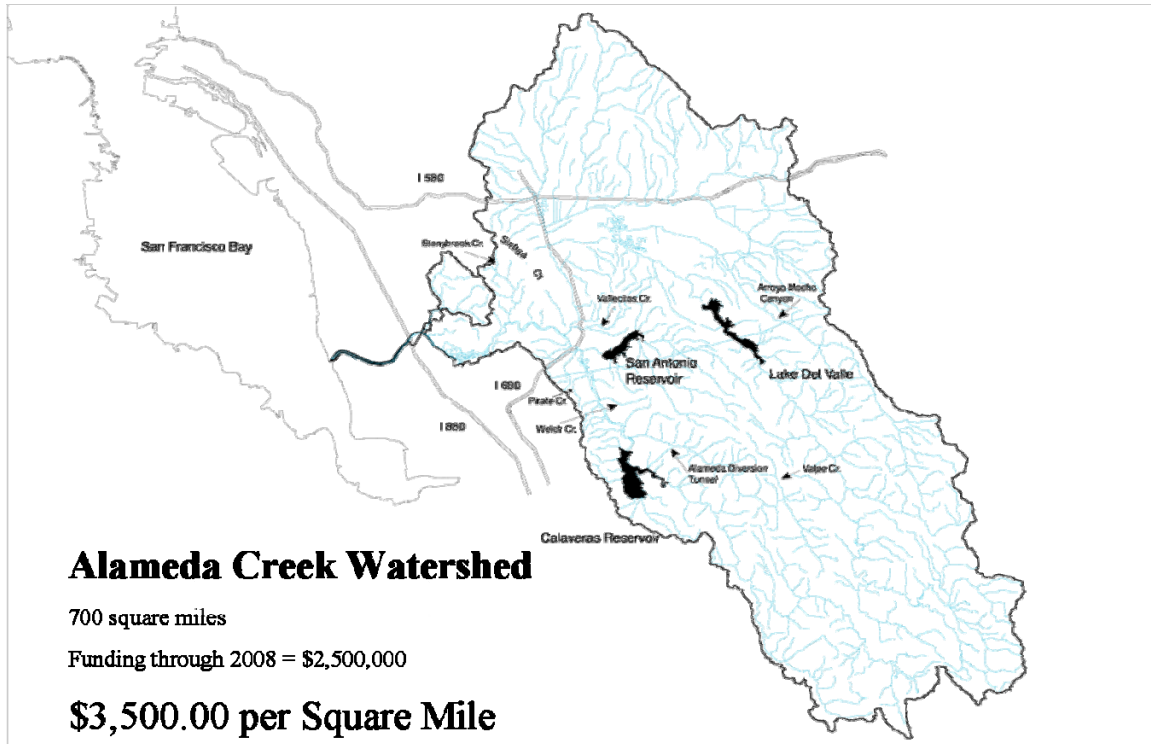


Figure 3.



Codornices Creek Watershed

1.1 square Miles

Funding through 2008 = \$3.3 million

\$3,000,000+ per Square Mile

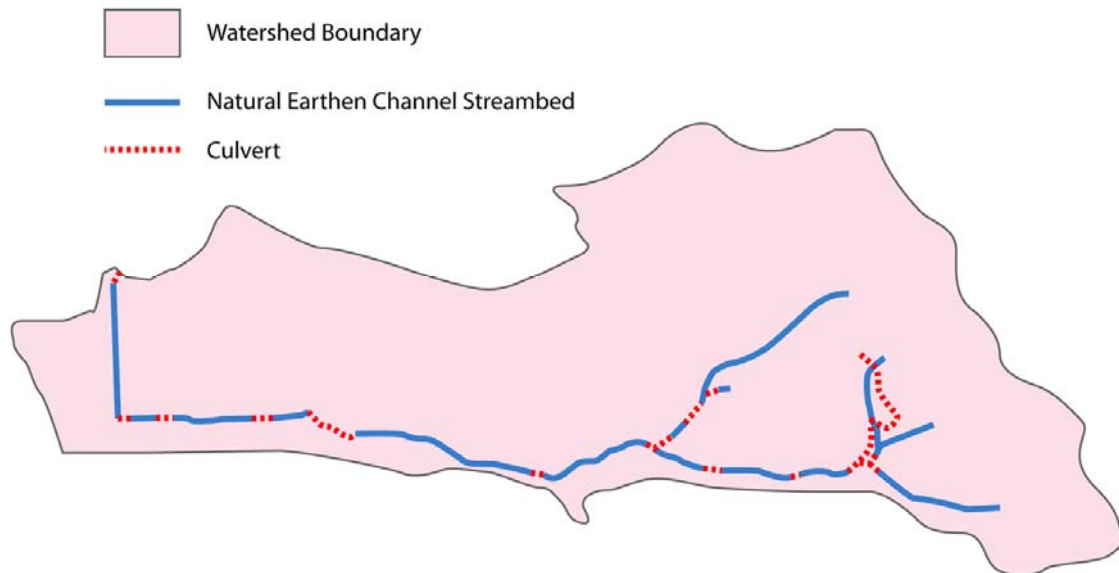
Methods

I have tried to contact people who could give me first hand accounts of the restoration efforts on Codornices Creek. I used interviews, emails, and telephone calls to talk with people who have been involved with Codornices Creek restoration projects. I attended a public workshop held by the Codornices Creek Watershed Council. I visited the sites that I could find and attempted to photo-document them. I used internet research to find articles about Codornices, as well as a statewide database of river and stream restoration projects.

Codornices Creek Current Conditions

Even though 85% of the Codornices Creek's course is through urban, industrial, and suburban environments, it runs in an earthen channel for most of its length and passes through few underground culverts. Most culverts are only long enough to take it under a road (Figure 4). Codornices Creek survived historically largely because of the complications created by it forming a boundary between the cities of Albany and Berkeley. Today, the sheer complexity of getting permits for creek work favors preservation (Schwartz, 2000).

Figure 4.



Source: museumca.org

Given the high density of urbanization on the creek, many local communities have embraced the creek and integrated it into their layout. For example, Codornices Creek runs through or near Codornices Park, the Berkeley Rose Garden, Live Oak Recreation area, St. Mary's High School, the University of California's married housing development (the University Village), and through many private backyards. This direct connection that so many share with the creek, plus the fact that it is so visible because it rarely is buried underground, has led to many restoration projects (Schwartz, 2000).

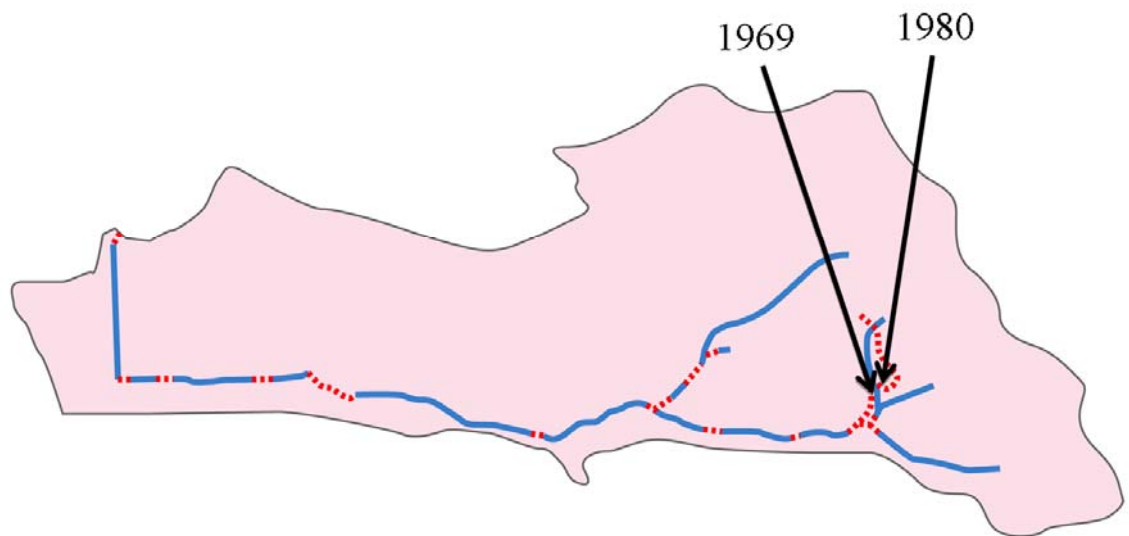
Community Involvement - Early Days

One of the early restoration projects on Codornices Creek was in 1969. An Ecology Center cleanup effort took 200 pounds of glass and a half ton of scrap metal out of Codornices Creek in Berkeley (Schwartz, 2000).

In 1976, the city of Berkeley purchased the land that Codornices Park is on. In 1980, a community group, Los Amigos de Codornices, came together to develop a park plan and begin a series of community work parties to restore paths, meadows, hillsides, bridges, and trails in the park

(<http://www.ci.berkeley.ca.us/ContentDisplay.aspx?id=12118>).

Figure 5.



These are some of the first Creek restoration projects in the Codornices Watershed. Many have followed since the first Creek restoration projects. The rest of this paper will chronologically document the known subsequent projects, their goals, funding, and monitoring status. The projects are discussed as follows:

1. Codornices Creek - 3/1/1990 - 6/1/1991,
2. Daylighting the Creek in Berkeley – Mid 1990's
3. Codornices Creek at Live Oak Park, Berkeley - 6/1/1995
4. UC Village Restoration by Albany, Berkeley, UC Berkeley - mid 1990's - Current
5. Codornices Creek at Ohlone Greenway - 7/10/1999
6. Codornices Creek Restoration Project - 3/16/2000 - 8/30/2001
7. CCWRAP Phase I - 6/15/2001 - Ongoing
8. CCWRAP Phase II - 12/1/2004 - 3/31/2008
9. Codornices Creek Salmonid Restoration – 2005 - 2007
10. CCWC Interpretive Elements - 2008

(See Figure 6 for a location map of the projects and a project timeline and table 1 for a matrix of all listed projects, funding, lead agencies, and project descriptions)

Figure 6.

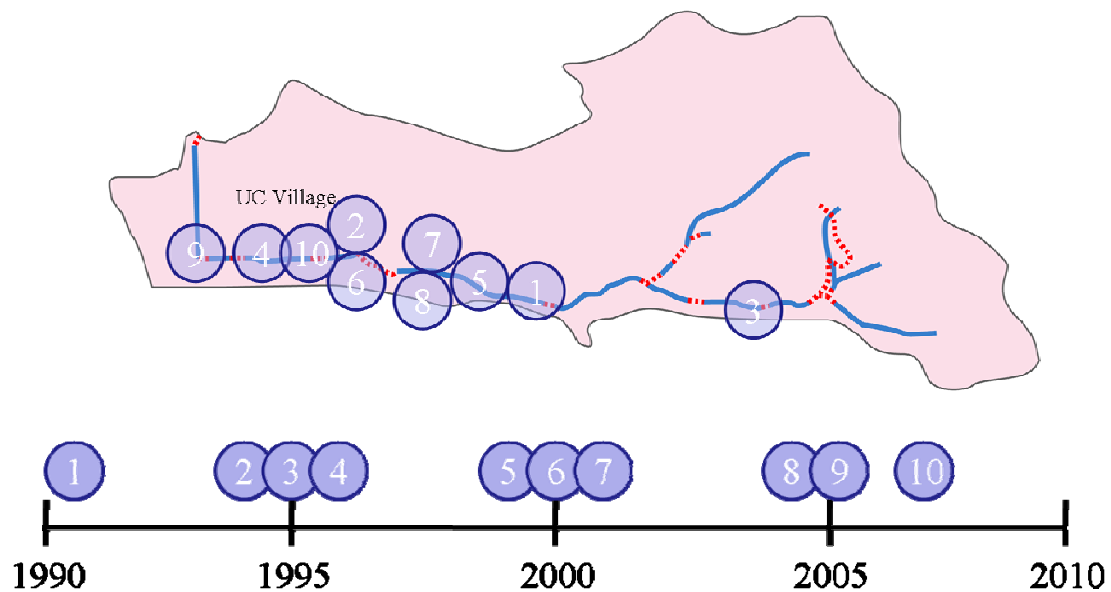


Table 1.

Project No.	Project Name	Date	Lead Agency	Money Obtained	Project Purpose	Monitoring Included
1	Codornices Creek	1990 - 1991	UCC	\$33,990	Check for erosion	No
2	Daylighting the Creek in Berkeley	mid 1990's	UCC	\$20,000	Daylighting at UC Village	No
3	Codornices Creek at Live Oak Park, Berkeley	6/1/1995	FiveCreeks	\$900	Invasive plant removal	No
4	UC Village Restoration by Albany, Berkeley, UC Berkeley	mid 1990's - current	City of Albany	\$2,350,000	Ecological/habitat restoration, stream bank stabilization	yes
5	Codornices Creek at Ohlone Greenway	7/10/1999	FiveCreeks	\$55,000	Pedestrian observation area and streambank plantings	no
6	Codornices Creek Restoration Project	2000 - 2001	UCC	\$10,000	Replant the daylighted area of project #2.	no
7	CCWRAP Phase I	2001 - current	UCC	\$285,000	Create a watershed plan for the earea east of San Pablo	not necessary
8	CCWRAP Phase II	2004-2008	UCC	\$502,500	Act on findings of CCWRAP Phase I	yes
9	Codornices Creek Salmonid Restoration	2005 - 2007	UCC	<i>unknown</i>	Widen culverts under railroad, create CCWC, add auto-monitoring to the creek.	yes
10	CCWC Interpretive Elements	2008 - current	CCWC	\$86,000	Educational and cultural elements and improvements	<i>Unknown</i>

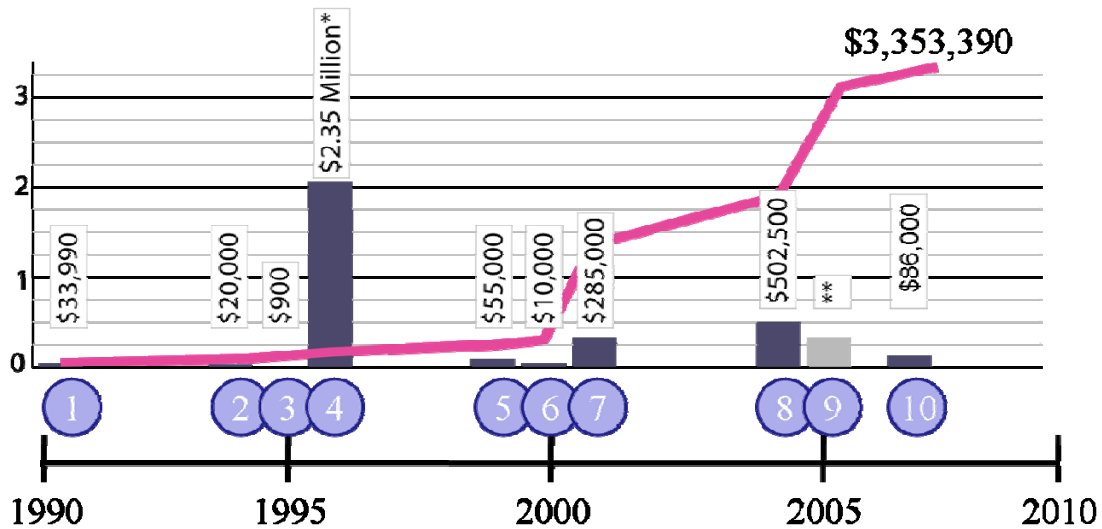
Figure 7.

Project Funding Chronologically

in millions of dollars

*This money awarded between 2000 and 2007. Still seeking additional funding.

** Unclear how much money was awarded to this project.



1. Codornices Creek - 3/1/1990 - 6/1/1991

This project was organized by the Urban Creeks Council (UCC). It was funded by the Department of Water Resources through the Urban Streams Restoration with \$33,990 made available by Proposition 13 (NRPI Database).

This was the first restoration project on Codornices Creek which was funded by government grants. The description for this project on a statewide database states that "Codornices is the last and only creek in Berkeley, Albany, and Oakland which is natural along nearly its entire length and appears to be repairable to full health. The upstream

reach of Codornices Creek is heavily urbanized, and the property owners have experienced erosion and flooding problems." (NRPI Database)

The purpose of this project was to identify existing sources of erosion and construct a demonstration project which will control erosion and provide a strong educational catalyst for homeowners to learn about the erosion control process, and to restore and preserve the upstream reach of Codornices Creek (from the Berkeley hills to San Pablo Avenue) for erosion and flood control as well as riparian values (NRPI Database).

This project resulted in a walkthrough of the entire length of Codornices Creek by an erosion repair and a fisheries specialist to inventory critical erosion sites while noting barriers to fish passage. The UCC also presented workshops to educate property owners, creek neighbors, and interested local citizens about care and repair of creek problems. The UCC removed sufficient vegetation to prevent sediment buildup and replaced an existing upright concrete retaining wall with a slightly sloped masonry wall. In all, they restored five different sections of Codornices Creek (NRPI Database).

There were no monitoring measures put in place for this project (NRPI Database).

2. Daylighting the Creek in Berkeley –Mid 1990's

This project was organized by the UCC with \$20,000 funding obtained by the UCC (Schwartz,2000). The portion of the Creek that was daylighted is at the east end of the

UC Village property, near San Pablo. It was accomplished with volunteer manual labor and volunteer bulldozing from Urban Ecology. It is unclear how long this project lasted, and exactly when it occurred .

The purpose was to follow the successful model that the UCC applied to Strawberry Creek earlier of daylighting several hundred feet of buried creek to create more natural habitat and bio-diversity. This method of daylighting the creek also proved to reconnect the neighbors to the creek. These were the goals for the lower Codornices Creek in Berkeley (Schwartz, 2000).

3. Codornices Creek at Live Oak Park, Berkeley - 6/1/1995

This project was organized by the Friends of Five Creeks. The funding was provided by Alameda Countywide Clean Water, City of Berkeley, and the Rose Foundation for Communities and Environment. Each group contributed \$300, for a total of \$900 (NRPI Database).

The purpose of this project was to remove exotic invasive plant species (mostly English and Algerian ivy) from the north bank of Codornices Creek and plant appropriate natives. The selected native plants used were California Pipevine (*Aristolochia californica*), Douglas' Iris (*Iris douglasiana*), Gooseberry (*Ribes sp.*), and Pacific Ninebark (*Physocarpus capitatus*) (NRPI Database).

There was no monitoring plan developed for this project (NRPI Database).

4. UC Village Restoration by Albany, Berkeley, UC Berkeley - mid 1990's - Current

This project is being lead by the City of Albany. There was a planning phase to this project which was funded by \$100,000 from the Coastal Conservancy and \$97,000 from Caltrans. The design and installation stage of the project is funded by \$550,000 from Local Bonds, \$815,000 from the Coastal Conservancy, and the \$985,000 from the Department of Water Resources for a total of \$197,000 in the planning phase and \$2.35 million for the design and construction phase (Coastal Conservancy, 2005).

This project began in the mid-1990's when the University of California began its redevelopment of the University Village student housing. As an alternative to culverting or channelizing the creek, the Cities of Albany and Berkeley and other stakeholders worked with the University to create a project that would allow for creek restoration and trail linkages. The desired creek restoration consisted of salmonid habitat and riparian corridor restoration (Coastal Conservancy, 2005).

This project was divided into four phases. Each phase addresses creek restoration in terms of flood control with salmonid habitat restoration as a requirement. Two of the phases have already been designed and installed. Phase one was complete in the summer of 2004, and phase two was completed in 2007. The third phase is currently being designed and constructed. The fourth phase is a reach of the stream that needs little or no work. There is no work planned for phase four (Codornices Creek Improvement Plan, 2004).

Figure 8. Improvements made to the UC Village



5. Codornices Creek at Ohlone Greenway - 7/10/1999

This project was organized by the Friends of Five Creeks. It was funded from multiple organizations and people for a total of \$6,000 in cash donations and \$49,000 donations in-kind (NRPI Database).

The purpose of this project was to re-vegetate Codornices Creek west of Ohlone Greenway on the regional bicycle/pedestrian trail, control erosion, and add an observation railing overlooking the creek (fivecreeks.org).

There was no monitoring plan for this project. The project suffered from a high loss of plants due to poor soil, lack of irrigation, poor planting methods, trampling, and theft. It was also difficult to establish vegetation under the BART tracks where there is no rain and also in the highly compacted, flood-scoured flood channel close to creek (NRPI Database).

This project is significant because the Friends of Five Creeks discovered and confirmed significant, healthy populations of mixed-age *Oncorhynchus mykiss* (rainbow trout or steelhead) in Codornices Creek. This finding has been used to justify many salmonid projects on other creeks of this size (fivecreeks.org).

Figure 9. Installed Pedestrian Observation Overlook



Figure 10. Creek Cleanup at the Ohlone Greenway



Source: www.fivecreeks.org

6. Codornices Creek Restoration Project - 3/16/2000 - 8/30/2001

This project was organized by the UCC. It was given \$10,000 by the San Francisco Bay Fund (NRPI Database).

The purpose of the project was to advance the restoration of Codornices Creek by re-vegetating and restoring the channel banks and newly constructed wetlands along the proposed project reach on the boundary of Berkeley and Albany. This involved youth corps, neighborhood, and citizen organizations participating in tree planting projects (NRPI Database).

The long term success of the project was measured by channel stability, survival of native riparian plantings, and community engagement and satisfaction with the completed project (NRPI Database).

This project included monitoring twice per year for three years, but it is unclear who was designated to do the monitoring, if the monitoring was done, or what the results of the monitoring were (NRPI Database).

7. CCWRAP Phase I - 6/15/2001 - Current

The Codornices Creek Watershed Restoration Action Plan (CCWRAP) is organized by the Urban Creeks Council. \$285,000 in funding came from the Department of Water Resources through Calfed, from money provided by proposition 50 (NRPI Database).

The purpose of this project is to build on the efforts of the Urban Creeks Council and others to combine all the studies conducted in previous projects into one

watershed plan. The plan was based on increasing the small steelhead population that exists in parts of the Codornices Creek (NRPI Database).

The plan, completed in 2004, identified potential barriers to fish migration and chronic erosion sites, assessed existing available habitat, and analyzed physiochemical water quality parameters. The plan offered restoration recommendations to restore and enhance fish and wildlife habitat throughout the entire creek corridor and create a well-defined and sustainable Codornices Creek monitoring program. The culmination of this project is detailed in a report titled Codornices Creek Fish Passage and Habitat Improvement Project (www.urbancreeks.org).

Since the scope of this project was to study the creek and create documents, there is no post project monitoring needed. Phase II to this project includes acting on key items outlined by this report as outlined in the section below on the CCWRAP Phase II (NRPI Database).

8. CCWRAP Phase II - 12/1/2004 - 3/31/2008

This project was organized by the Urban Creeks Council. Funding came from the Department of Water Resources as a Calfed grant for \$482,500 by funds from prop. 50. Chevron Pipeline Division also donated \$20,000 (NRPI Database).

The purpose for this project was to implement priority actions recommended in Codornices Creek Watershed Restoration Action Program Plan Phase 1 (#7 above). Specific goals were to increase the extent of salmonid habitat in Codornices Creek by

eliminating migration barriers without decreasing channel capacity and implementing stream bank stabilization demonstration projects. This project was also designed to improve overall creek quality to encourage the continuation and health of the remnant steelhead population, create on-site consultation to creekside residents, and hands-on riparian restoration demonstration projects. This project was also designed to implement a permanent community and science-based watershed program for the protection and restoration of the creek, continue water quality as well as salmonid population and habitat assessment monitoring (NRPI Database).

Monitoring of water quality and salmonid populations occurred twice, once in 2005 and once in 2006. A stream gauge and rain gauge were installed to provide real time data available on the internet. There is no other monitoring planned for this project (NRPI Database).

Figure 11. Step Pools installed as part of CCWRAP Phase II



9. Codornices Creek Salmonid Restoration – 2005 - 2007

This project was organized by the Urban Creeks Council, and original Funding came from Calfed. It is not clear how much this grant was for (Urban creeks.org).

This project has three main components. First was the development of the Codornices Creek Watershed Council with a paid Coordinator. Second was the development of construction documents for restoration of Codornices Creek between 2nd Street and the Union Pacific Railroad. Third was the development of a monitoring plan for the "Codornices Creek and Urban Fishery Restoration Manual" for use in measuring the impact of restoration projects within the watershed (Urban creeks.org)..

This grant is funded by the San Francisco Bay Salmonid Habitat Restoration Fund and was completed in June 2007 (Urban creeks.org).

10. CCWC Interpretive Elements - 2008

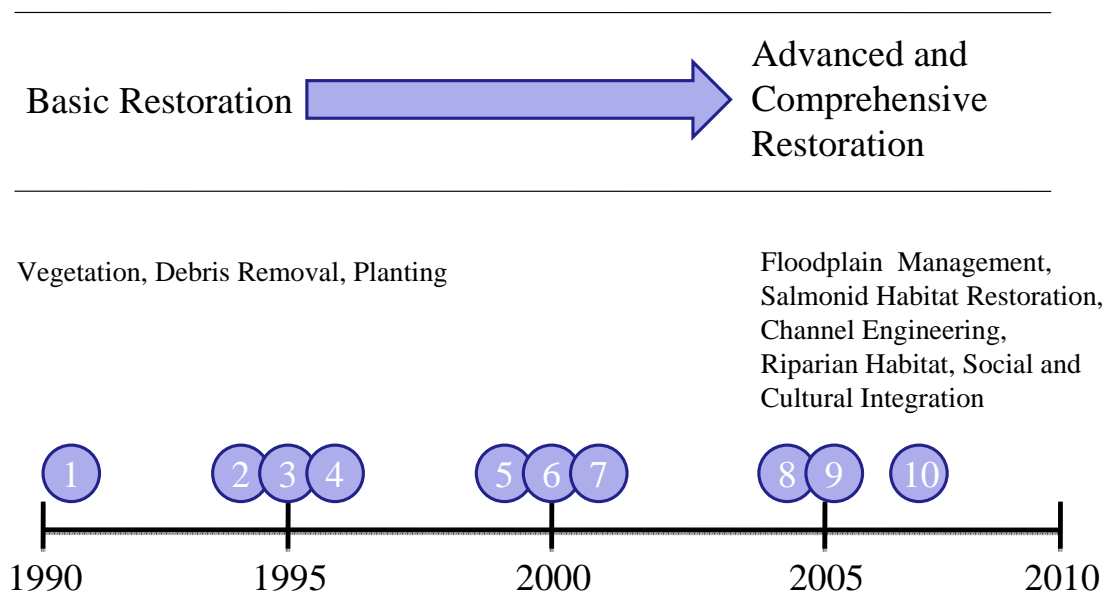
The Codornices Creek Watershed Council (CCWC) has received a Calfed grant for \$86,000 to evaluate the stretch of the creek between 6th and 8th streets for possible cultural improvements. This includes the design and installation of an outdoor classroom seating area, and the integration of the creek with the proposed walking/bike route. Their focus is incorporating community input into their design process to ensure that the final design is well suited to the needs of the potential users (email communication with Pam Boyle Nov. 21, 2008).

Conclusion

As demonstrated by the projects that have occurred in the Codornices Creek watershed, river and stream restoration is an evolving concept. On Codornices Creek, it started in 1969 with simple trash cleanup. Today restoration projects are multi faceted. The restoration projects occurring in the watershed today often involve stream bank stabilization, engineering, grading, ecological restoration, and cultural improvements. There is a strong need for volunteers to help with cleanup and beautification efforts. This is evident in the fact that many of the projects listed have a volunteer work element, a community design element, and/or workshops to engage and educate the public about the needs of their watershed.

Figure 12.

Project Scope Chronologically



Community elements do not organize and run themselves. There is also a need for community groups to organize these projects, and to help obtain the funding for the larger, more costly restoration projects. With groups like the Urban Creeks Council, Friends of Five Creeks and the Codornices Creek Watershed Council, the Codornices Creek is successfully receiving funding for restoration projects that include ecological restoration efforts, cultural and social improvements, and channel stability and floodplain improvements. This multi-level approach of volunteers, community organized creek advocacy groups, and city involvement, are what have made Codornices Creek so successful at obtaining funding and support. Codornices Creek should be looked at as a model for successfully obtaining funding for river and stream restoration projects because the community, community groups, landowners, and the local government have all come together and played different, but equally important roles in activating the restoration process on Codornices Creek.

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