Title
Contemporary streamkeepers : a comparison of two urban horticultural restoration programs

Author
Rowley, Charles

Publication Date
2003-12-08

Contemporary Streamkeepers: A Comparison of Two Urban Horticultural Restoration Programs

Final Draft

Date: December 8, 2003

Course: Landscape Architecture 227 - Restoration of Rivers and Streams
Professor: G. Mathias Kondolf,

By: Charles Rowley
Department of Landscape Architecture
University of California, Berkeley

Abstract

This paper presents a comparison of the successes and failures associated with two urban creek restoration programs, one in northern California (Temescal Creek, Alameda County) and another in southern California (White Oak Creek, Ventura County). Both programs were undertaken in response to flood control planning needs in urbanizing areas. The Temescal Creek effort was initiated nearly 30 years ago while the White Oak Creek program was completed about four years ago. Based on success criteria developed by the author, it is evident that the more recent White Oak Creek program has resulted in significant success while the earlier Temescal Creek restoration has not achieved what are considered generally acceptable levels of success criteria. An explanation for the differential degree of restoration achievement is provided in this paper. This explanation can be summarized briefly as being attributable to the following changes in management and scientific practice over the past 30 years.

First, the legal basis for achieving successful restoration has changed substantially during this time period. Monitoring requirements imposed by wetland/riparian regulatory agencies have provided an effective platform to enforce sustained monitoring and to require modifications to horticultural programs that fail during the monitoring period. Conservation easements are now typically required to provide perpetual legal protection to habitat restoration oriented programs. Monitoring programs and their periodicity are critical to long-term restoration success--the author recommends that the standard annual monitoring frequencies adopted by state and federal regulatory agencies should be increased.

Second, it is evident that properly engineered low flow distribution structures between retention basins and downstream areas are critical to success. Without proper engineering and careful testing and monitoring of low flow diversions, the essential sources of water and nutrients for a successful restoration program cannot be insured. The introduction of constant low flow water to an urbanized stream converts ephemeral and intermittent streams to new "artificial" perennial systems. These new hydrologic conditions are prone to invasive plant dispersion and can impact the adaptability of indigenous vegetation. This situation further supports the need for on-going monitoring and maintenance through the use of conservation easements.

Finally, social and local government political factors also play a role in the process of whether a sustained program of streambed restoration will succeed or fail. Changing demographics and community values may alter the integrity of the approved plan over time. Understanding and properly anticipating urban design issues and population pressures on a restored streambed substantially influence whether a program will, in the long run, succeed or fail as an habitat restoration effort. Planning the transition from professional monitoring to community 'Streamkeeper' programs is one way to ensure reliable long term monitoring.

Introduction: Problem Statement

Presently, streambed restorations in California are actively pursued by a number of agencies, government jurisdictions, water districts, public and private land trusts, and research scientists. In general, most of these programs are governed by legal requirements related to the Clean Water Act and are implemented under the dual jurisdiction of both state and federal agencies. Nearly all programs implemented under this regulatory framework are properly classified as horticultural restoration programs. The current state of legal support has not always existed and to demonstrate why such regulatory involvement is necessary and to illustrate how this regulatory process has improved horticultural restorations, I have compared a program conceived and implemented about 30 years ago, prior to the present suite of legal protections, and a program completed in 2001 that is still under regulatory review and monitoring.

The two horticultural restoration programs compared in this paper are situated in different parts of the state. (See Figure 1: Project Locations and Figure 2: Regional Settings following the end of the text). One of the restoration areas studied is situated in northern California within an urbanized section of Temescal Creek, in Oakland, California. This restored segment is lengthy (over 1,800 linear feet) and is situated downstream from a major retention facility (Lake Temescal, a flood control structure). The consulting engineers conceived of this program as a "reconstitution" of a creek segment in 1972.

The second study area is located in southern California on White Oak Creek, in Simi Valley. This restoration area is also downstream from (but more immediately proximal to) a major flood control detention facility with a constant low flow source of water, which is continually released into the restoration bed. This restoration work was completed in 2000 coincident with development of a major Specific Plan, which includes multiple housing projects, a major new cemetery serving the greater Los Angeles region, and several open space dedications. This restoration program has been in place for about four years. In contrast to the Temescal Creek program, this intervention was termed a "reconstruction" by its designers. Both creeks are situated along transitional edges of Foothill woodland communities, which share a range of tree species encircling the environment above the California Central Valley (Figures 1).

These projects have many similarities in concept but major differences in outcome. Both have been conceived to address regional flood control needs. Both are also situated in urbanized or urbanizing areas immediately adjacent to neighborhoods. The riparian system in both cases is generally intermittent rather than perennial in nature. Flood control planning efforts were significant considerations in the design and outcome of each program. Because more than a 30 year hiatus exists between the period when each program was implemented, the research problem involved developing an explanation for why one program can clearly be identified as a failure while the other appears to be successful. The paper outlines the primary variables that account for this differential success.

In summary, the primary differences between these two programs are directly related to the degree of regulatory agency review and involvement in the planning and restoration process. The Temescal Creek program was not constructed under the guidance of the present legal and regulatory safeguards for riparian systems (the state and federal Clean Water Act and Endangered Species Act as administered by the US Fish and Wildlife Service, the Army Corps of Engineers, and the California Department of Fish and Game). The Temescal Creek program evolved out of engineering practice as a flood control planning effort. The White Oak Creek restoration was regulated by the County and City planning process, the County Flood Control District, and the federal and state regulatory agencies that are responsible for streambed protection. The legal basis for long-term protection and program monitoring was clearly different for these two projects and, as my analysis demonstrates, this has been critical to the relatively higher achievement of success criteria regarding restoration efforts of the latter program.

Study Methods

The study methods used to complete the comparison of each program involved four identical steps which I completed for each study location:

1. Archival research about the history of each project was obtained from the following sources: The Water Resources Archive, and the College of Environmental Design Library at the University of California, Berkeley, as well as Flood Control and regulatory agencies involved in reviewing and approving the projects;

2. After this research was done, I then conducted interviews with principals involved in designing, engineering and implementing each program—for Temescal Creek, few of the principals involved in the design were available. Regional activists that were interviewed were recommended as

reliable sources regarding the history of the project and its evolution. Plans and specifications, as available, were reviewed for each project area.

3. Then, once archival and field work was done, I visited each site, walked the length of each segment, took notes and photographed the streambed courses in detail, I also visited the upstream detention structures and noted local land use patterns. A considerable amount of detailed channel inspection and flood control planning review was completed (presented in an earlier version of this paper).

Finally, I synthesized the archival data, field interviews, plans and contacted regulatory agency personnel and monitoring consultants for both locations to determine the status of monitoring results and future planning efforts. This step also involved obtaining information about what, from the perspective of various agencies, had and had not been achieved compared to the original vision for each project. I then synthesized the success and failure rates for both projects into table form to evaluate what percent of some important measures of restoration success had been achieved in both cases.

Results

Field and Archival Research at Temescal Creek

The reach of Temescal Creek that I reviewed is located within Alameda County in the highly urbanized Rockridge area of north Oakland situated at the base of the Berkeley hills. The creek flows roughly east-to-west from the upper elevation of the Berkeley hills (from headwaters at approximately 1400 feet) to the nearby San Francisco Bay. Stream flow exists all year long with low flows varying from less than 0.1 c.f.s. to .5 c.f.s. Occasional releases from Lake Temescal increase the flow to 10 c.f.s or more (Bissell and Karn 1972: 5-6).

A complicated circulation network has developed incrementally and now overlays the intensively modified morphology of the original stream. The “natural” conditions that once characterized the landforms and drainages surrounding the creek are no longer present. The engineering firm described the original proposed redesign of Temescal Creek as a “reconstitution,” (Bissell and Karn 1972:4). Flood control “improvements” were initiated after a major storm, which occurred on October 12th and 13th in 1963. In addition, health concerns supporting modification of the streambed and the establishment of a detention structure were cited by local regulatory agencies in approving the project. An increasing rat population in the creek, the issue of insects as disease vectors, and crime-related concerns were raised to ensure further constituency support for the flood control work. At the time of the 1963 floods, the project area was still an open-air creek.

As an offset to the impacts associated with developing a flood control retention system and channelizing segments of the creek in the study area, a proposal was developed that involved recreating an at-grade reconstituted creek bed, which would overlie the RCB channel improvements. As planned, the original incising creek bottom would be about 20' below the proposed (roughly current) grade. In this concept, the proposed RCB system was connected to the existing discharge system out-letting from Temescal Reservoir-- which, of course, also served detention functions. However, and this is critical, how water was to be diverted to the "reconstituted" above ground creek was neither studied nor disclosed in the available public documents. It is very possible this hydrologic connection never was properly planned or implemented. Unfortunately, other aspects of the "mitigation" planned for this project were either poorly conceived, inadequately detailed, or were not diligently implemented undoubtedly due to the lack of supervision of independent "third party" regulatory agencies.

In the original Environmental Impact Statement (EIS) for the project, there is no discussion of a monitoring program, no guidelines offered regarding a revegetation plan, and no discussion of the value of habitat restoration or enhancement. In addition, no direct plan of connection, proven to be workable in the EIS document, between the restored at grade "reconstituted" streambed and the stored water in Lake Temescal was provided in the EIS either. The engagement of a trained horticulturist is mentioned as a mitigation measure in the effort to protect various tree species during the process of re-grading, re-contouring and filling the re-constituted creek. The most detailed reference to any restoration effort concerned the iconic value of some mature "heritage" trees (non-natives). Gradually, as the record of correspondence for the project and interviews with local environmental activists revealed, the entire notion of a successful "reconstituted" creek has now been substituted for the concept of a recreation-oriented greenway. Whether this set of changes would have evolved had the original concept of restoring a "managed flow" been successfully carried forward is unknown. A central aim of the original proposal was the concept of a circulating low flow regimen above the reconstituted streambed: "The park design would be centered about a small creek to be reestablished within the right of way by pumping Temescal Creek water to ground level. The reconstituted creek would harmonize with and accentuate the linear nature of the proposed park, providing a focus for lay out of trails, resting spots, and landscaping. The design of park trails would be integrated with the creek and the narrow right or way to achieve a corridor effect inviting the user to walk and experience what the park has to offer. The reconstituted small creek will also serve as a local storm drain by receiving runoff from adjoining properties which have historically drained to the creek". (Bissell and Karn 1972:6). This stated intent was clearly not the outcome as illustrated in Figure 3 (Current Conditions: Temescal Creek). What the written record, interviews and physical inspection of the field conditions demonstrated unequivocally is that the original concept for restoration was not implemented successfully.

Field and Archival Research at White Oak Creek

The other project studied is located in northeastern Ventura County, near the Santa Susanna Pass. Regionally, White Oak Creek is tributary to the Arroyo Simi, which drains the Simi Valley over a distance of approximately 36 miles in a southeasterly direction towards the Oxnard flood plain and Ventura Harbor. The White Oak Creek restoration program was part of a coordinated restoration effort involving a number of developers who have participating in building out housing and other uses within the Douglas Ranch Specific Plan Area. The segment of White Oak Creek comparison study was implemented by Standard Pacific Homes under the regulatory authority of the Corps of Engineers, Department of Fish and Game, and the City of Simi Valley.

The restoration program was designed to satisfy two purposes: first, to compensate for the major disruptions to White Oak Creek which resulted from the construction of access roads and flood control measures, and to create a common area that functions as both a habitat amenity and as a density buffer and urban design feature within the neighborhoods situated on either side of the Creek. The Standard Pacific Homes White Oak Creek restoration is immediately linked upstream to a major flood control facility that was built within the Creek's active streambed boundary in the newly constructed Mount Sinai Memorial Park. To comply with the Clean Water Act, horticultural riparian restoration programs were required for both the Memorial Park and the Standard Pacific residential development. As in the case of the Temescal Creek project, the scope of these restoration projects was clearly flood control, not process driven.

The Standard Pacific Homes restoration included a subdivision of land which set aside about three acres of riparian restoration which is served by conducting stored detention waters beneath a manufactured, at grade, "re-constructed" streambed alignment. This reconstructed streambed carries a perennial flow of up to 195 c.f.s. through a diversion from the immediately upstream detention structure (within the Mount Sinai Memorial Park project). The upstream detention basin gathers both neighborhood street discharge, as well as potential irrigation run-off from the Memorial Park as well as storm water flows. The diversion was designed to support a range of riparian vegetation in the streambed. The gradients between the cemetery and residential projects were carefully adjusted and matched. In contrast to the Temescal Creek program, this artificial streambed was designed, disclosed in detail, and is considered a success by both the regulatory agency and the lead agency (City of Simi Valley). The current state of the restoration effort and relationship between development, conservation buffer and the streambed is illustrated in Figure 4 (Current Conditions: White Oak Creek).

Although flood control issues were primary considerations, in this case riparian horticulture restoration and habitat planning were also considered to be of primary importance—unlike Temescal Creek. This is clearly expressed in both the planning efforts and the design. The adjacent development changed 'Faux' White Oak Creek from a natural ephemeral channel to a manufactured perennial flow channel. This is a common outcome in southern California restoration projects because most of the time, such projects are designed to incorporate increased continual flows from upstream residential developments. The plan to create a horticultural restoration program was a condition of the project approval. As an amenity, creating a protected common area with habitat functions in a contemporary subdivision is unusual. The reconstructed reach of White Oak Creek now has the character of a young riparian greenbelt.

Based on my review of the monitoring records (Janowicz, J, 1999, 2000, 2001, 2002), over the period of monitoring, perennial flow has been provided without interruption into the Standard Pacific Homes restoration area. This site has been under regulatory monitoring for four years. The monitoring period has been extended beyond the established five-year time frame because of a series of early failures which more frequent monitoring would have revealed. The relative success of each project is compared in Table 1 through a series of defined success criteria. The two projects differ considerably, largely due to changes in the law, which provided a framework for the following precautions and planning efforts that were incorporated into the White Oak Creek project:

1. Although Flood Control measures to mitigate development impacts were the primary design consideration, horticultural restoration was also a significant component to the project.

2. Monitoring efforts were successful at enforcing the replanting of various species that failed. The system allows for adaptive management through revision of the native plant palette based on both changes to surrounding soil structure and to the hydrologic conditions of the artificial perennial stream.

3. Continuous flow of water in the stream bank is well documented and has been required as a result of routine monitoring and reporting.

4. Lack of structural and recreational encroachment within the streambank reveals a thriving, undisturbed riparian vegetative cover. A minimum adequate corridor size allows for variable flow conditions.

5. The conversion of status from ephemeral to perennial streams increases the establishment of invasive exotics that otherwise would be less of a, (or a non) presence in the streambed. The program of maintenance to remove these invasive species needs to be and is likely to be part of an ongoing maintenance concern.

Unlike the outcome at Temescal Creek, for this project, there is a close correlation between original concept and implementation. The low flow diversion has been carefully designed so that it is reliable and operates within the parameters of the source detention waters. The low flow device is calibrated not to rainfall data but to neighborhood runoff flow rates, the actual reliable source of water for the restoration. In this respect, “natural” hydrologic conditions were determined not to be the governing design requirement for long-term success—flow rates out of the upstream neighborhoods were the determinant. The establishment of a firm legal basis for the protection of the restored area, (through a Conservation Easement), and the creation of an enclosure around the restoration site have ensured that the surrounding community does not encroach upon the project.

Conclusions

The following conclusions are derived from comparing these two restoration projects. Although both projects were designed to produce similar results, the outcomes were disparate. The 'Faux' Temescal Creek program was clearly a failure relative to its intent to maintain some level of flow. This outcome appears to have resulted from a number of factors. Although the County of Alameda historically tolerated individual property owner's pre-code structural encroachments into the streambed, other factors influenced the failure of this program and include the following: a lack of detailed planning, failure to include sufficient detail in the EIS describing how the hydrology of the restored creek was to function, absence of ultimate support to implement the proposed concept by the City of Oakland, lack of participation by state and federal regulatory agencies, which led to a lack of legal protection and absence of the type of Clean Water Act full disclosure process that exists today. As a result, because the hydrologic concept either failed or was not feasible, the community acted to convert the "reconstituted" streambed to a conventionally landscaped greenway park.

Failure to establish, maintain and legally protect the "reconstituted" streambed opened the future possibility for local efforts to install recreational amenities that were in short supply elsewhere in the community. As the streambed has gradually converted to land dedicated to recreational and parks uses, the landscape design has evolved accordingly. In concert, community participation and stewardship programs appeared to supplant habitat monitoring for the Temescal Creek implementation process. Practical concerns, such as a lack of political will to provide for other accessible urban open space needs, and community health issues likely exert influence here. However, it remains the case that this conversion is in part, unrelated to the design concept originally approved in 1972.

In contrast, even though equally complex and similar in scope, 'Faux' White Oak Creek in Simi Valley is considered relatively successful. The hydrology of the up and downstream sections of the creek were planned to provide constant low flow diversion functions. The restoration program accepted the change from an ephemeral to perennial drainage type and plans were made accordingly to implement this new hydrology regime from the standpoint of horticultural planning. Monitoring was required and is on going.

Table 1 (Percentage of Restoration Criteria Achieved) below summarizes the specific criteria that I developed for evaluating the relative success of a restoration. Based on these criteria, a comparison of these variables documents that the two programs have significantly different success rates. I have attempted to explain some of the differences in success and failure in these two projects. A more complete summary of explanatory factors is provided in Table 1. Using this inclusive system of comparison, the Temescal Creek program satisfied 22% of the success criteria, while the White Oak Creek program achieved 52% of the objectives that are identified.

Table 2 (Recommendations for Improving Riparian Restoration Programs) outlines considerations in planning for future restoration programs. It is clear that good conceptual work is important to the overall success of a restoration project but effective monitoring is no less important. Diligent monitoring research concerning restoration effectiveness is important if the restored wetlands and riparian corridors now being added to the state's inventory of important habitats are to be preserved for the long term.

Other studies indicate that the top-down, expert-oriented approach should be re-considered and re-tooled to include a transition from professional monitors to local stakeholders by the end of the monitoring period (Duane, 1997; Rahman, 2003). I propose an approach that I refer to as the 'Streamkeepers' program. This would be organized as an effort to link the process of professional monitoring with community stakeholders (i.e. the homeowners association in the case of White Oak Creek) in attempting to ensure the longevity and integrity of the restoration beyond the required period. Evidence indicates that such "bottom-up," community participation oriented measures are most critical to conducting truly sustainable environmental programs and may be key to extending the limits of institutional memory beyond the life span of required monitoring programs.

Table 1. Percentage of Horticultural Restoration Criteria Achieved		CREEK STUDY AREA	
		Temescal Creek	White Oak Creek
1.	Legal Stream Protection: Dedicated Conservation Easement		X
2.	Engineered Continuous Perennial Flow		X
3.	Vegetation Monitoring Program		X
4.	Adjacency To Dedicated Open Space		X
5.	Annual Survey of Hydrologic and Channel Profile Changes		
6.	Provides Habitat Corridor Linkage		
7.	Planned Monitoring Program of 5 – 7 Years		X
8.	Evidence of Well-Maintained Irrigation	X	X
9.	Initial Soils Testing		X
10.	Annual Plant Counts		X
11.	Adaptive Revegetation Implementation	X	X
12.	Native Riparian and Upland Vegetation Reproduction		X
13.	Non-Commercial Native Plant Nurseries or Propagation Source		
14.	No Structural Encroachment Into Stream Channel		X
15.	Annual Water Quality Testing	X	
16.	Adaptive Management Plan For Exotic Invasive Species		
17.	Presence Of Anadromous Salmonids		
18.	Observation of Other Aquatic Life		
19.	Observed Terrestrial Wildlife Activity		X
20.	Defined Trails & Places For People	X	
21.	Ground Water Level Test Well for Annual Monitoring		
22.	Salvage / Reconstitution of Alluvial Rock for Habitat Restoration and Streambed Morphology		
23.	Active Community Stewardship Programs	X	
Percentage of Criteria Successfully Met:		**22%**	**52%**

Table 2. Planning Recommendations to Improve Restoration Programs		CREEK STUDY AREA	
		Temescal Creek	White Oak Creek
1.	Acquire Legal Stream Protection: Dedicated Conservation Easement	X	
2.	Needs Designed / Engineered Linkages Managing Perennial Flows	X	
3.	Vegetation Monitoring Program	X	
4.	Annual Survey of Hydrologic and Channel Profile Changes	X	X
5.	Adjacency To Open Space	X	
6.	5 – 7 Year Maintained Irrigation During Monitoring Period		
7.	Establish & Maintain Dominance Of Native Riparian Species	X	
8.	Source Non-Commercial Native Plant Nurseries &/or Propagation Consultant	X	X
9.	Information Transfer: Engage Stakeholders As Streamkeepers		X
10.	Perform Annual Water Quality Testing		X
11.	Documentation of Native Vegetation Reproduction	X	
12.	Mandate Restart of Monitoring Period After Catastrophic Events		
13.	Outline Adaptive Management Plan For ‘Exotic Invasive’ Species	X	
14.	Design for Anadromous and Associated Species (Future Possibility)	X	X
15.	Salvage / Reconstitution of Alluvial Rock for Habitat Restoration and Streambed Morphology	X	X
16.	Improve Presence of Terrestrial Wildlife	X	
17.	Plan for Ground Water Test Wells		X
18.	Acquire Available Land Along the Upper Bank and Flood Plain	X	
19.	Protect Dedicated Habitat From Recreational Greenways	X	
20.	Promote Community Streamkeeper Programs	X	X

Figures

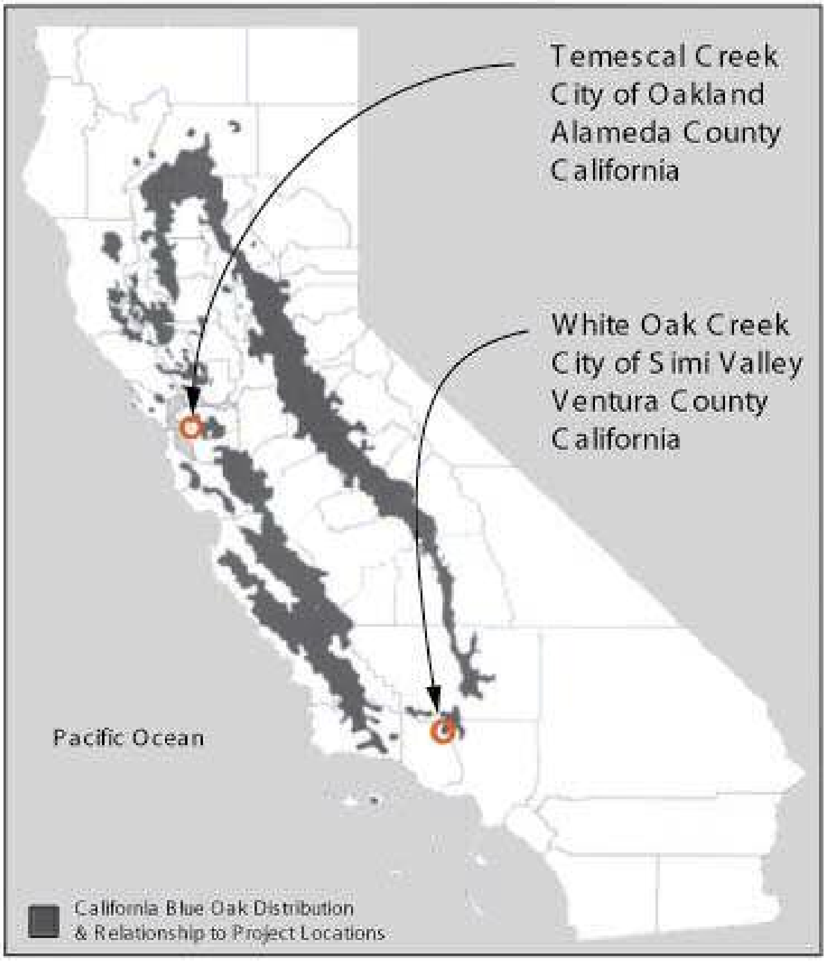

Figure 1

Project Location Map

Contemporary StreamKeepers: A Comparison of Two Urban Horticultural Restoration Projects

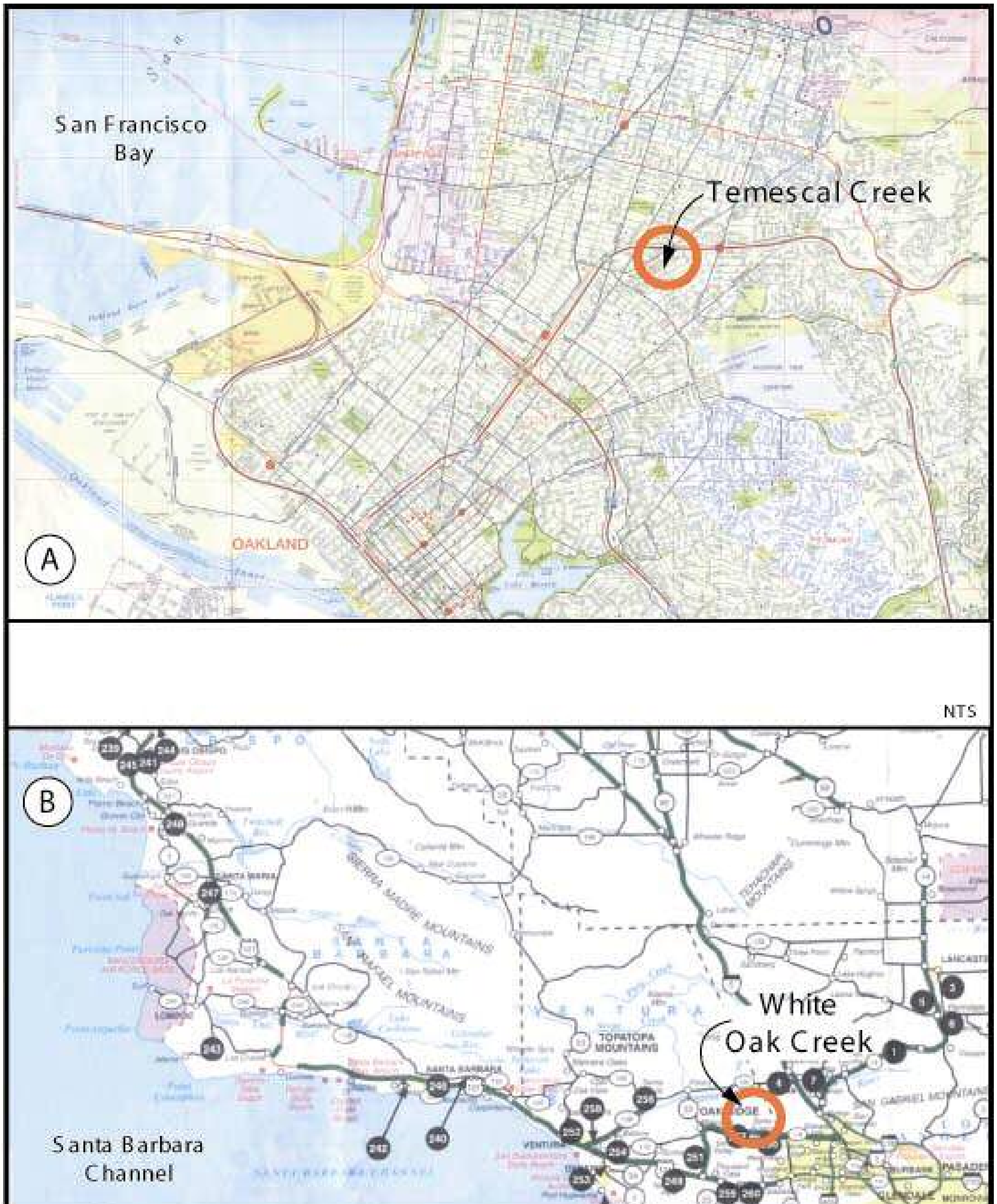

Figure 2 Regional Settings

Contemporary Streamkeepers: A Comparison of Two Urban Horticultural Restoration Projects

Temesca Creek View Corridors

Contemporary StreamKeepers: A Comparison of Two Urban Horticultural Restoration Projects

Figure 3

Fall 2003
LA 227
UC Berkeley

Charles Rowley

(A) BEFORE: The 'reconstituted' conditions of 'Faux' Temescal Creek creek indicate little evidence of water and the absence of native riparian vegetation along the reach of Clarke St. to Clifton St.

(B) AFTER: Recent redesign of Temsecal Creek reveals encroachment limitations, where a storm drain collects any drainage along the constructed 'thalweg' (far left). Both the concrete path and a new landscape program belie the existence of either the culverted creek 20' below the surface, or a re-composed streambed.

(C) Current View From Claremnt Avenue
Entrance to Temescal Creek on Claremont Avenue near Telegraph, in Oakland, California. Both the remnant channel of 'Faux Temescal' and the greenway are not visible from the public right-of way.

(D) Entrance to "Frog Park' at Cliifton Street: The redesign completes the transition from a 'reconstituted' creek to a recreational greenway. The primary objectives involve managing flood control problems and providing a much needed outdoor space within a highly urban context.

Figure 4

Fall 2003
LA 227
UC Berkeley

White Oak Creek Corridors

Contemporary StreamKeepers: A Comparison of Two Urban Horticultural Restoration Projects

(C) A Reference Species, Platanus racemosa (the California Sycamore), is the last remaining specimen within this reach. Replanting from direct propagation was not performed and nursury stock was used instead. Protective grading was enacted to avoid damaging roots and manage exposure to perennial flow.

(A) White Oak Creek, Simi Valley, California - Residential Housing development manages flood control through a 'recreated' creek bed with engineered perennial flow, riparian vegetation and upland species. Metel enclosures surround the project, minimizing human disturbance during the establishment period. Backyards are oriented to the planned future views of a riparian corridor.

(B) Left Bank North View: The set back of the upper terrace illustrates the relationship between the constructed channel, the flood zone, residential back yards, and the protection of developing riparian habitat. The enclosure provides a protected common area, a view corridior and buffer zone that is not easily accessable. Pampas grass on adjacent private property (right) reveals the difficulties of limiting the introduction of exotic species in the future. Perhaps future planning guidelines for Homeowners Associations should address limiting invasive exotics near riparian corridors.

Charles Rowley

Bibliography

Bissel & Karn, Inc. Civil Engineers, 1972, Environmental Impact Statement, The Improvement of A Portion Of Line A – Temescal Creek From San Pablo Avenue To Adeline Street And From The Vicinity of Telegraph Avenue To Hardy Street In Oakland And Emeryville, California, Prepared for the Alameda County Flood Control and Water Conservation District

Craig, Steven, 1998 Permit Applications for the Mt. Sinai Memorial Park (And Associated Residential Development) – U.S. Army Corps of Engineers, Regional Water Quality Control Board, California Department of Fish and Game, Section 7 Consultation with the Fish and Wildlife Service, Individual Permit Application, The Planning Corporation, 1998

Duane, Timothy, 1997, Community Participation in Ecosystem Management, Ecology Law Quarterly 24, 771-797

Environmental Science Associates, 1993, Environmental Impact Report, Temescal Regional Recreation Area, LUDP, Prepared for the East Bay Regional Park District Planning/Stewardship Department

Janowicz, Jascha 2000, 2001, 2002, 2003 Monitoring Reports on the White Oak Creek "Standard Pacific Homes Residential Project", prepared for the Department of Fish and Game and the Army Corps of Engineers, JJ Environmental Consultants and Planners, Los Angeles

King, Chester, 1978 Handbook of California Indians, Smithsonian Institution, Washington, D.C.

Munz, Philip & Keck, David D. 1959, 1968 A California Flora And Supplement, University of California Press

M. Perron and Davy, 2001, Handbook of Ecological Restoration, “Rivers and Streams”, article by: W. Downs, K.S. Skinner and G.M. Kondolf, 2001

Sawyer, John O. & Keeler-Wolf, Todd. 1995. A Manual of California Vegetation, California Native Plant Society

Personal Communications:

Emily Wisnosky, personal communication, Stetson Engineers, San Francisco, California
Bruce Douglas, personal communication, Friends of Temescal Creek & the East Bay Watershed Project.
Matt Branoff, Mt. Sinai Memorial Park, Maintenance Supervisor
Jasch Janowicz, Environmental consultant, Standard Pacific Homes project
Steven Craig, personal communication, Planning Corporation
Joe McBride, personal communication, Dept. of Environmental Science and Policy Management
Barry Hecht, public communication, First Symposium on Restoration of Rivers and Streams, UC Berkeley & Alliance Francais, November 2003.
Ausaf Rahman, presentation on issues related to restoration projects in developing countries, UCB, 2003

Websites consulted:

http://www.acme.com/jef/creeks/temescal
http://www.museumca.org/creeks/16-OMTemescal,html#
http://www.frogpark.org
http://www.sunsite.berkeley.edu