Topanga Creek Restoration: Rodeo Berm Removal

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Abstract

Approximately 30 years ago, a trapezoidal earthen berm, 1000 feet long and 40 to 100 feet wide, was placed directly in the channel of Topanga Creek to protect private property and homes built in the floodplain. The berm was augmented several times with asphalt and waste products from various road-building projects. After the property was purchased by the California Department of Parks and Recreation, a multi-agency partnership convened to fund and implement a berm removal and creek restoration project. Berm removal resulted in 3000 linear feet of connectivity critical for migrating steelhead trout, as well as invasive species removal and establishment of native wetland and riparian communities on over 12 acres of floodplain. Snorkel surveys after restoration revealed trout ranging from five to eight inches using newly formed pools in the restored channel.

Disturbance of the floodplain in Lower Topanga Creek has a long history. Using the 1876 U.S. Coast Survey map as the basis for pre-disturbance condition, it appears that the floodplain once supported a mixed oak and sycamore riparian woodland with a channel following the low contours of the west hillslope. By the 1920s, the property had been purchased by the Los Angeles Athletic Club, who envisioned creating a deep water harbor in Topanga lagoon and associated amenities in the surrounding area. Evidence of a small rodeo ground riding ring and dirt roads are noted on a 1924 USGS geology map. Over the years, the manipulation of the floodplain with impacts on the creek channel continued. By the 1940s, aerial photos indicate that the channel had been shifted due east with a dirt road and fill evident in the west section of the floodplain.

The Rodeo Grounds Road Berm was installed without plans or permits in 1969 and rebuilt in 1980 and 1995 by tenants to protect their rental homes from flooding. It was built in several stages, realigning and replacing a lower, smaller dirt road that had been installed in the 1920s (Figure 1). According to local residents, asphalt and paving from the Lincoln Blvd. repaving project were placed on the site in the late 1960s. Additional road spoils from throughout the watershed were added to raise the berm higher following the 1980 flood (Envicom 2006).

In 2001, the property was purchased by California Department of Parks and Recreation (CDPR) to connect upper Topanga State Park with the ocean. Between 2001 and 2005, several preliminary surveys were conducted and the Lower Topanga Interim Plan was produced (California Department of Parks and Recreation 2002). The Interim Plan called for the relocation of the remaining tenants and removal of the structures within the floodplain. This phase of the floodplain restoration was completed by 2006.

Figure 1. Topanga Creek Rodeo Berm, *Photo: RCDSMM*

The Rodeo Grounds Road Berm was trapezoidal in shape – 1,000 feet long, between 40 to 100 feet wide and between 12 to 18 feet above natural creek grade. The berm bisected the Topanga Creek floodplain in a north-south alignment in a low gradient depositional area 2,500 feet upstream from the interface with the Pacific Ocean at Topanga Beach. The total surface area from toe to toe covered approximately 80,000

square feet (1.8 acres), and the volume of fill material was estimated to be approximately 19,000 cubic yards weighing approximately 26,000 tons (GeoPentech 2005).

Preliminary soil testing in six boreholes along the berm found that a significant portion of the fill qualified as non-RCA lead contaminated California Hazardous Waste (GeoPentech 2005). A detailed Berm Removal Plan incorporating sequential removal steps, stockpiling needs, and Best Management Practices (BMPs) for controlling erosion and preventing spread of lead contamination during and following excavation was developed (Envicom 2006). Extensive biological and hydrological studies were conducted to develop a wetland delineation and Caltrans approved Traffic Control Plan (Figure 2). A Mitigated Negative Declaration was prepared and certified in 2006 and all regulatory permits were obtained by spring 2008. The final construction plans and bid documents were prepared and posted in June, with the contract awarded in late July to Miller Environmental, Inc.

Figure 2. Project Impact Area

Restoration Goals

The Rodeo Grounds Road Berm was identified as a keystone barrier impeding fish passage for endangered southern steelhead trout (CalTrout 2005). The berm had caused buildup of sediments for over 1,000 meters of creek channel and caused the creek to flow subsurface for much of the year. Topanga Creek is one of only three creeks in the Santa Monica Bay that support endangered southern steelhead trout (Dagit et al. 2005). This population is severely at risk and Topanga Creek was identified by National Oceanographic and Atmospheric Administration National Marine Fisheries Service (NOAA-NMFS) as a priority system for recovery purposes due to its good water quality, relatively natural hydrologic regime, lack of invasive aquatic species, and overall ecological quality (NOAA-NMFS 2009). Monitoring of the steelhead from 2001 to the present indicates that their abundance has increased yearly and reproduction and recruitment are taking place (Dagit et al 2009).

The primary objective of the Revegetation and Restoration Project was to restore the area previously covered by the berm and integrate required revegetation and tree mitigation plantings into the restoration area that included the surrounding 12 acre floodplain (Goode and Cox 2006). Plants were selected to match the surrounding wetland, riparian, and coastal sage communities (Table 1).

Funding

It took several years and many grant applications to assemble the estimated $3.3 million project cost. The Resource Conservation District of the Santa Monica Mountains (RCDSMM) took the lead on writing the grants, eventually securing $500,000 from the Santa Monica Bay Restoration Commission (SMBRC), which provided the foundation of matching funds needed to obtain $1,591,300 from the Wildlife Conservation Board, $450,000 from Supervisor Zev Yaroslavsky, $240,000 from the California Department of Fish and Game (CDFG) Fisheries Restoration Grant Program, $50,000 from the NOAA Community Based Restoration Program, $90,000 in-lieu wetland mitigation fees from the Mountains Recreation and Conservation Authority, and over $400,000 of in-kind contributions.

Implementation

The on-site excavation commenced on August 9, 2008 and was completed on October 9, 2008. A total of 1,334 truck loads, each carrying up to 20 tons of materials, were removed. All but the 96 loads of lead contaminated soil were recycled as either landfill soil cover, greenwaste mulch, or rock debris converted to roadbed material.

Biological, archeological, and Native American monitoring before, during, and following the project provided guidance on preserving any relevant significant resources. It is known that the Tongva people used the area in the mouth of Topanga, and it was possible that the project could reveal evidence of Native American use. Although no cultural resources were found, vigilant monitoring provided useful guidance to the construction staff.

Table 1. Species Palette for Revegetation of the Rodeo Grounds Berm Project

Scientific Name	Common Name	Upland/ CSS	Floodplain	Berm Footprint
TREES				
Alnus rhombifolia	White Alder		X	X
Heteromeles arbutifolia	Toyon	X	X	
Juglans californica	CA Walnut	X	X	
Platanus racemosa	CA Sycamore		X	X
Populus f. fremontii	Fremont Cottonwood	X	X	X
Quercus agrifolia	Coast Live Oak	X	X	
Salix exigua	Narrow-leaf Willow		X	X
Salix laevigata	Red Willow		X	X
Salix lasiolepis	Arroyo Willow		X	X
Sambucus mexicana	Mexican Elderberry	X	X	
Umbellularia californica	California Bay	X	X	
SHRUBS				
Baccharis salicifolia	Mulefat	X	X	X
Eriogonum cinereum	Ashyleaf Buckwheat	X		
Eriogonum fasciculatum foliolosum	CA Buckwheat	X	X	
Malosma laurina	Laurel Sumac	X	X	
Rhus integrifolia	Lemonadeberry	X	X	
Salvia mellifera	Black Sage	X	X	
HERBACEOUS PERENNIALS AND SUB-SHRUBS				
Encelia californica	CA Bush Sunflower	X	X	
Eriophyllum c. confertiflorum	Golden Yarrow	X	X	
Lotus scoparius	Deer Weed	X	X	
Lupinus succulentus	Arroyo Lupine	X	X	
Mimulus aurantiacus	Orange Bush Monkey Flower	X	X	
Oenothera elata hirsutissima	Evening Primrose	X	X	
GRASSES				
Elymus g. glaucus	Blue Wild Rye			X
Nassella pulchra	Purple Needlegrass	X	X	

Unfortunately, the berm was built around several large Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) and western sycamore (*Platanus racemosa*) trees. When the fill material was removed, the trunks that were buried up to 20 feet in the ground were too rotten to support the trees and they were removed. The trunks were cut into 20 foot sections and strategically placed along the restored banks to provide erosion control. Cuttings were taken from the cottonwood and grown out in the California Department of Parks and Recreation Angeles District nursery for later outplanting.

A critical component of the restoration was removal of the existing exotic and invasive species, and re-establishment of native aquatic, riparian woodland, and coastal sage scrub communities. Immediately following excavation, the 40,000 square foot staging, stockpiling, and haul route areas, as well as the newly configured stream bank were hydroseeded with a native seed mix (Table 2). All seeds came from local sources approved by CDPR. Between December 2008 and July 2009, volunteers have contributed over 1,000 hours of time to weed and plant over 400 native plants (Table 3).

Hand Watering New Seedling, *Photo: RCDSMM*

Table 2. Seed Species List

Species	Number lbs/Acre
Ambrosia psilostachya	2
Eriogonum cinereum	6
Leymus codensatus	3
Lotus scoparius	6
Lupinus bicolor	4
Lupinus succulentus	6
Plantago erecta	4
Trifolium gracilentum	2
Trifolium wildenovii	4
Verbena lasiostachys	2
	39 total

Table 3. List of Plants Installed on December 13, 2008

Species	Common Name	Size container	Number Planted
Platanus racemosa	CA Sycamore	2 gallon 1 gallon	2 3
Populus f. fremontii	Fremont Cottonwood	15 gallon D cell	1 2
Quercus agrifolia	Coast Live Oak	5 gallon 2 gallon Acorns	3 1 40
Juglans californica	CA Walnut	2 gallon	1
Umbellularia californica	CA Bay	2 gallon	4
Salix exigua	Narrow Leaf Willow	1 gallon stakes	10 25
Salix lasiolepis	Arroyo Willow	1 gallon	10
Baccharis salicifolia	Mulefat	1 gallon stakes	20 25
Elymus g. glaucus	Giant Wild Rye	D cell	40
Rosa californica	Wild Rose	1 gallon	4
Rubis ursinus	CA Blackberry	D cell	25
Artemesia vulgaris	Mugwort	D cell 50	50

Results

The restoration of the floodplain and riparian corridor in the Rodeo Grounds Road Berm area of Topanga State Park has allowed natural re-alignment of the creek channel in response to storm events, re-adjustment of the channel bed as accumulated sediments are naturally entrained, and natural recruitment of riparian species. Volunteer seedlings of mulefat (*Baccharis salicifolia*), giant rye (*Leymus condensatus*) and sycamores are abundant. The channel flow was fully connected to the ocean from the first big rainstorm in December 2008 until late March 2009. Snorkel surveys revealed that trout ranging from five to eight inches were using newly formed pools.

Eventually, restoration will result in a more natural creek channel. Over 12 acres of wetland and riparian floodplain were reconnected hydrologically and ecologically. Restored above surface creek flow will provide summer rearing habitat as well as improve over-winter habitat and critical passage links for endangered southern steelhead trout between the main stem of Topanga Creek and the ocean.

Additionally, it is anticipated that restoration will allow natural storm flushing of accumulated sediments from upstream of the project area, restoring over 3,000 linear feet of creek connectivity that is critical for migrating adult and juvenile steelhead trout. The removal of these sediments should also result in a more natural diversity of geomorphologic habitat units, which should provide additional spawning and rearing habitat for fishes.

Hydroseeded Streambank, *Photo: RCDSMM*

Lessons Learned

It always takes longer than you think it will to accomplish a restoration project! We started the effort in 2003 and it took until 2008 to implement.

It always costs more than you think it will! We were faced with yearly inflation and cost changes that averaged about 20% per year. Since it took almost three years from the time we secured the first grant until the project was implemented, we were really glad that we had estimated the overall project cost based on a worse-case scenario. It also helped to have obtained three different bids when we were developing the project costs to help guide us.

The devil is in the details! It is really critical to try to anticipate problems and incorporate language into the CEQA documents, permits, and bid document that allows for flexible response to unforeseen problems. It is also critical to define the project limits with sufficient buffer, so that if an unexpected diesel oil spill contaminates the boundary, the contractor will work with you to remove the problem!

The biggest lesson learned was persistence. These projects are the cumulative effort of numerous bureaucracies, regulatory agencies, and funders, each of which has their own agenda and timeline. It was only by continuous effort at moving the project forward step by step that we were able to achieve our goal.

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