

Texas Crossing Removal in Malibu Creek

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Abstract

Many streams in our coastal areas are impacted by road structures, including bridges and instream crossings. Environmental groups and state agencies in the Santa Monica Mountains are reconsidering the need for and design of such crossings. This article documents the low-cost techniques used to remove a large Texas crossing in Malibu Creek State Park. The Texas crossing in Malibu Creek was in disrepair and presented a serious safety issue. Large amounts of sediment had accumulated upstream of the structure, and heavy scouring had created a large pool immediately downstream. The removal of the crossing has improved stream hydrologic features and habitat. Restoration efforts will allow unimpeded movement of the federally endangered steelhead trout within a one-mile stretch of the creek.

Malibu and Las Virgenes Creeks, both within the Malibu Creek State Park, are impacted by a variety of road structures within the stream channels, including bridges, concrete (Texas) crossings, and unpaved crossings. Heal the Bay and the California Department of Parks and Recreation (State Parks) have been working together to remove or redesign many of these structures to improve stream habitat within the Park. The most recent effort by these two organizations was the removal of a Texas crossing in Malibu Creek in 2006 and 2007.

The Texas crossing in Malibu Creek, owned and operated by State Parks, was an elevated creek crossing in disrepair. Undersized culverts had led to massive scouring by streamflows and the collapse of portions of the 220 foot long stretch of concrete forming the base of the crossing. The crossing posed a safety risk for users and caused severe degradation of upstream and downstream habitat. Elevated road crossings such as this often end up functioning similarly to dams, in that they cause water slowing and sediment build-up immediately upstream of the structure. As the upstream bed becomes elevated, water flows over the top of the crossing and scours out the stream bed at the downstream end of the crossing. This scouring eventually creates a deep pool on the downstream end, which forces upstream migrating fish to jump onto the concrete road bed and then swim through 30 feet of shallow water, across the road, to migrate upstream. The jump height for fish was five feet at this Texas crossing (Figure 1). Downstream erosion on both banks of the stream was also severe.

The Texas crossing was 220 feet long, 30 feet wide, 10 to 12 inches thick, and was constructed of steel reinforced concrete. There were five 24 inch corrugated metal pipe culverts running through the center of the structure that no longer transported water due to excessive sedimentation upstream of the crossing.



Figure 1. Dilapidated Texas Crossing Prior to Removal,
Photo: Heal the Bay

Removal of Texas Crossing

State Parks worked closely with Heal the Bay's Stream Team to remove the Texas crossing. State Parks was instrumental to the project, helping to prepare environmental impact assessments, acquiring all necessary permits, and securing labor from State Parks. Direct support provided by State Parks included four staff members for 20 days to assist with the barrier removal and a large backhoe and operator for two days to assist with removing large debris from the stream channel. State Parks also insured that resources were protected through frequent visits to the site by a staff Resource Ecologist and involvement of State Parks personnel with experience working in sensitive habitat areas.

The Texas crossing barrier removal project took 39 work days between October 4, 2006 and November 28, 2006. Approximately 1/3 of the structure was located in the water, and was removed by hand, using a gas powered jackhammer/drill, and feathers and wedges (Figure 2). This manual technique enabled the removal of concrete that was in contact with the water while minimizing environmental damage. The feather and wedge removal process can be seen in the "Adiós Texas Crossing" time-lapsed video available on Heal the Bay's website at <http://www.healthebay.org/videos/default.asp>.



Figure 2. Drilling Holes with the Gas Powered Jackhammer and Placing Feathers and Wedges, *Photo: Heal the Bay*

The remaining 2/3 of the crossing located outside of the stream channel was removed using heavy equipment, specifically a bobcat with backhoe and breaker bar attachments. Thirty-seven 10-yard concrete dumpsters were removed and recycled from the project site, totaling 304.5 tons of concrete. Additionally, two 32-yard dumpsters with approximately 50 tons of steel in the form of rebar and culverts were removed from the site and recycled. The overall cost of the Texas crossing removal; including labor, equipment rentals and supplies, and concrete and steel removal and recycling; was approximately \$38,000. This funding was provided by State Parks, the Santa Monica Bay Restoration Commission, and the State Coastal Conservancy.

After removing the crossing, Heal the Bay and State Parks replanted the site with native vegetation. Approximately 1,450 plants were installed to mitigate the disturbance to the stream banks adjacent to the Texas crossing removal site. Plant species included purple needlegrass (*Nassella pulchra*) in areas with bare soil above the riparian zone, California blackberry (*Rubus ursinus*) in the higher riparian zone, and arroyo willow (*Salix lasiolepis*) stakes near the waters edge in the lower riparian zone. Native riparian vegetation is also naturally recruiting at the site.

Results

The site is performing as expected. The large scour pool below the crossing is filling in and a riffle has formed in the former crossing location (Figure 3). Additionally, the sediment deposit behind the old crossing has been dramatically reduced, despite the fact that no large storm events (greater than four inches in 24 hours) have occurred since the removal (Figure 4). No head cutting or upstream channel erosion has occurred, as is typical with these projects and the stream bed is relatively stable. We expect the site to continue to improve over time while we wait for some more significant rain events.



Figure 3. Texas Crossing Removal Site after Rain Storm, January 29, 2007, *Photo: Heal the Bay*

The Texas crossing will not be replaced and has opened approximately 1 mile of high quality habitat for spawning and rearing for the federally endangered southern steelhead trout upstream of the Rindge Dam. Since the crossing was removed, cobble and gravel have replaced finer sediments and algae on the stream bed, providing improved habitat for benthic invertebrate species and fish at this location.



Figure 4. Texas Crossing Removal Site after Rain Storm, January 9, 2008, *Photo: Heal the Bay*

Mark Abramson is the Director of Watershed Programs for the Santa Monica Baykeeper. Working in stream and wetland restoration for 15 years, he created the highly successful Malibu Creek watershed Stream Team program for Heal the Bay during his 10 years of employment before joining the Santa Monica Baykeeper 3 years ago. Mark is also managing the Malibu Lagoon restoration project for the State Coastal Conservancy and State Parks and is engaged in stream restoration on Stone Creek at the UCLA campus.