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May 09, 2007

Phat Funds Announced for Mission Creek Fish Passage Hydraulic Study
by David Pritchett, news contributor and amateur fluvial hydrogeomorphologist

Building upon a technical study that has been advancing for nearly 3 years, a total of \$355 thousand from 2 grants, was announced or re-announced to support a critical hydraulic study or model to determine how a fish passage feature would function in the artificial open concrete channels that comprise one mile of Mission Creek in downtown Santa Barbara.

The Santa Barbara City Creeks Division, a unit of the Park and Recreation Department, would receive the funds totaling \$355 thousand. Results from the model are expected in early 2008.

Announced through a newsletter email on 01 March 2007 and earlier in public documents for the City Creeks Committee and California Department of Fish and Game (CDFG), the City was awarded a grant from CDFG for \$155 thousand to construct a 1:20 scale physical model of portions of Mission Creek to test the feasibility of removing some of the bottom bed of the concrete channels. The model will assist in evaluation of the hydraulic performance of several possible channel modifications that would allow for fish passage so endangered Steelhead Trout can swim up the creek to awesome habitat in Rattlesnake Creek, an upper tributary of Mission Creek.

A second and more surprising grant was the announcement on Tuesday morning (08May2007) that Environmental Defense Center (EDC), a local non-profit organization and public interest law firm, recently secured a grant of \$205 thousand from the Annenberg Foundation. Up to \$180 thousand of that grant will be made available to the City to support the creek channel hydraulic study. That's right, EDC is granting funds to the City.

A news conference about all this was held Tuesday morning (08Mar2007) and featured 4 news reporters, 2 project partners in Mission Creek fish passage efforts (including this writer), 2 EDC staff leaders, 2 County Supervisors, 2 Supervisor staff assistants, 1 City Engineer, 1 City Administrator, 2 City Creeks Division managers, 5 City Councilmembers, and 1 Santa Barbara City Mayor. The event happened at the bus stop where Arrellaga Street crosses over Mission Creek adjacent to the freeway. This location was selected because its view of the interface of the concrete channel and the naturalistic creek channel immediately upstream.

On a day approaching a record for heat, the crowd of dignitaries and staff looked

cool. County Supervisors Wolf and Carbajal were ultra casual and extra relaxed because their Board meeting was canceled for the week.



An [11-minute video](#) (with poor audio because the event, after all, was at a bus stop by the freeway) has been posted of the news conference and remarks from the speakers.

More description of Steelhead Trout in Mission Creek is in [this news piece at Edhat](#) last month.

As hydraulic studies of artificial creek channels is not such an intuitive issue, here is even more background on this project and the issues:

In downtown Santa Barbara, a wide bend of Mission Creek was cut off by the freeway (U.S. Hwy. 101) construction in 1964. To convey the creek flows by connecting the natural channels upstream and downstream, CalTrans built a large open trapezoidal concrete channel along the freeway. Dubbed by locals as the "CalTrans Channel", this new artificial channel --in two reaches or segments totaling one mile-- became the new Mission Creek and formed a severely impassible barrier to endangered Steelhead Trout swimming upstream. In April 2000, January 2005, and March 2007, Steelhead were observed building a redd or spawning only slightly below the downstream end of the CalTrans Channel, implying strongly that the fish could not get any further upstream and were making due with the available habitat in the urbanized remnants of the natural channel.

As part of a public-inspired initiative to make Mission Creek friendly to fish and function as a natural bluebelt in downtown Santa Barbara, NHC (a river engineering firm based in Seattle) was engaged by EDC to prepare conceptual and intermediate-level designs and cost estimates for establishing fish passage through the mile-long CalTrans Channel. NHC was the engineering consultant for the design, working closely with City and County authorities and a consortium of steelhead recovery advocates, including Environmental Defense Center, Community Environmental Council, Santa Barbara Urban Creeks Council, Southern California Watersheds Alliance, and other local groups and individuals.

Three intermediate cost alternatives for modification of the CalTrans channel were developed or evaluated by NHC in late 2005. Previous work by the Corps of Engineers and the City of Santa Barbara developed concepts for a lowest cost alternative with limited potential for successful fish passage through a design for a

small notch in the bottom of the concrete channel. At the other end of the cost range, a much high-level alternative was conceived to remove the entire trapezoidal concrete channel and some adjacent structures, thereby restoring a completely natural channel and overbank floodplain along the freeway corridor.

The leading design by NHC focused on developing intermediate alternatives that would provide greater chance for successful fish passage and yet continue to provide at least the existing level of flood protection in the concrete channel. Working with the original numerical hydraulic computer model developed by the Corps, a more detailed model was developed to simulate 3 alternative designs, and to determine anticipated water surface profiles and velocities throughout the CalTrans channel reach. In addition, a sediment transport model was developed for the reach to assess the potential for adverse effects on sediment transport capacity, and to identify zones where potentially increased sediment removal maintenance efforts might be needed. Preliminary feasibility-level construction costs were also developed for the 3 intermediate alternatives, based on the refined designs developed by NHC.

These 3 intermediate-level alternatives essentially are variations on designs that remove cross-sectional portions of the channel bottom and 1 side (the left streambank) of the trapezoidal concrete channel. This design allows for the streamflow conveyance capacity of the channel to be maintained even though substantially higher roughness elements, which slow down flood flows, are added to the channel as a major improvement for fish passage. The roughness elements mainly consist of a soft-bottom, cobbly streambed inspired by the natural channel of Mission Creek just slightly upstream of the CalTrans channel. These fish passage enhancements would slow down flow velocities, provide resting refugia for fish swimming upstream, and increase the fish-swimmable window period following rainstorms.

The final report with cool pictures will make it all more easier to understand. It is expected in early 2008.

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