

RECLAMATION

Managing Water in the West

TR-2015-04

Travel to Trabuco Creek, San Juan Capistrano, CA and Los Angeles River, Los Angeles, CA

Site visit to impassable fish barrier location on Trabuco Creek where proposed engineered fishway may be constructed and site visit to LA River to view site where future river restoration efforts are planned.

Date(s) of Travel: July 28 – 29, 2015



**U.S. Department of the Interior
Bureau of Reclamation
Technical Service Center
Hydraulic Investigations and Laboratory Services Group
Denver, Colorado**

BUREAU OF RECLAMATION
Technical Service Center
Denver, Colorado

TRAVEL REPORT

Code: 86-68560 Date: September 18, 2015

To: Manager, Hydraulic Investigations and Laboratory Services
From: Connie Svoboda, Hydraulic Engineer

Subject: Site visit to Trabuco Creek in San Juan Capistrano, CA and Los Angeles River in
Los Angeles, CA

1. Travel period: July 28-30, 2015
2. Places or offices visited: Trabuco Creek, San Juan Capistrano, CA and Los Angeles River, Los Angeles, CA
3. Purpose of trip: Site visit to impassable fish barrier location on Trabuco Creek where proposed engineered fishway may be constructed and site visit to LA River to view site where future river restoration efforts are planned.
4. Synopsis of trip: Connie Svoboda and Kent Walker arrived in San Diego, CA on the morning of July 28th and traveled to San Juan Capistrano, CA to meet Doug McPherson (LC Region Southern California Area Office) and Drew Irby (Trout Unlimited, South Coast Chapter) for a site visit of a proposed Trabuco Creek fish passage project. On July 29th, Doug, Connie and Kent traveled to Los Angeles, CA to view a proposed river restoration site on the LA River. Connie and Kent returned to Denver on July 30th.

The Trabuco Creek fishway project is located within the city of San Juan Capistrano in Orange County, CA. Trabuco Creek (total drainage area of 54.6 mi²) is a tributary of San Juan Creek and joins it roughly 2.3 miles upstream of San Juan Creek's exit to the Pacific Ocean. Roughly 2.2 miles upstream of the confluence with San Juan Creek, Oso Creek (drainage area of 16.7 mi²) joins Trabuco Creek (drainage area 36.4 mi²). Upstream of the confluence with Oso Creek, there are two grade control structures that create barriers for upstream fish migration to Cleveland National Forest.

The lower structure is a large concrete and grouted rock drop structure at the Metrolink light rail crossing that is an impassable fish barrier in a critical habitat area for endangered southern steelhead. The project goal is to replace the existing structure with an engineered fishway. At the request of Trout Unlimited, CDM Smith designed a proposed cascade and pool fishway to provide passage for steelhead. The fishway consists of a sequence of pools with one large pool followed by four small pools. Concrete sills separate pools, and boulders and larger rock are placed strategically to provide hydraulic control in the fishway.

Northwest Hydraulic Consultants (NHC) constructed a 1:6 and 1:20 scale physical hydraulic model at their hydraulics laboratory in Seattle, WA to evaluate the performance of the proposed design (Figures 1 and 2, Northwest Hydraulic Consultants 2015). Reclamation supported the project by providing Endangered Species Act (ESA) funds for the sediment testing. Connie traveled to NHC in December 2014 to observe and provide input on sediment testing occurring in the 1:6 scale model (Svoboda 2015). Trout Unlimited is currently seeking financial support from project partners to complete the project. It is anticipated that Reclamation may be able to provide support in terms of technical advice and design review for this ESA-related project.



Figure 1. Physical hydraulic model (1:6 scale) of a section of the proposed Trabuco Creek fishway design at Northwest Hydraulic Consultants hydraulics laboratory in Seattle, WA.



Figure 2. Physical hydraulic model (1:20 scale) of the proposed Trabuco Creek fishway design at Northwest Hydraulic Consultants hydraulics laboratory in Seattle, WA.

The team walked to the Metrolink light rail fish barrier on Trabuco River where the proposed cascade and pool fishway would be constructed during the first phase of the restoration project. The existing grouted drop structure was severely undermined by scouring and stream degradation. Significant erosion of Oso Creek due to urban runoff has incised the channel and degraded the bed of Trabuco Creek.



Figure 3. Upstream view of grouted grade control structure at the Metrolink light rail crossing on Trabuco creek.



Figure 4. Downstream view of grouted grade control structure at the Metrolink light rail crossing on Trabuco creek.



Figure 5. Vegetation downstream of the existing grade control structure.



Figure 6. Significant scour hole and stream degradation downstream of the grouted section.

During the site visit, Connie, Kent, Doug, and Drew also stopped at the upstream fish barrier which is roughly 0.5 miles upstream from the Metrolink grade control structure. This upstream drop structure will be the second phase for the Trabuco Creek fish passage project. The concrete drop structure includes 2 notched low-flow channels and a stilling basin with baffles and an endsill. It is unlikely that modifications to the low-flow channels can occur due to concerns about embedded piping. Fish passage would likely need to be provided adjacent to the drop structure. If steelhead are able to pass this barrier, they can move upstream into Cleveland National Forest without further obstructions.



Figure 7. Upstream concrete drop structure produces an impassable fish barrier.



Figure 8. View of concrete drop structure looking upstream.

On July 29th, Connie, Kent, and Doug traveled by train to Los Angeles, CA. The train ride afforded views of Oso Creek, Trabuco Creek, and the LA River that cannot be seen by automobile. The Los Angeles River Revitalization project is a multi-agency effort to restore parts of the highly urbanized LA River (www.lariver.org). Reclamation has provided Title XVI funds to re-use most of the recycled water that currently makes up base flow for the Los Angeles River. The Title XVI project is not fully implemented yet, but the Los Angeles Department of

Water and Power (Title XVI grant recipient) has agreed to leave a portion of the recycled water in the river to support biological functions. Nathan Holste (Reclamation's Sedimentation and River Hydraulics group) has submitted a scoping proposal "Sustainable Low-flow Ecosystem Features in High Energy Urban Channels" for funding consideration to Reclamation's Science and Technology Program in FY16. Part of this research project includes identifying if the LA River may be a suitable pilot project location for examining restoration possibilities in an urban stream with recycled flows.

A highly modified, hard-bottomed section of the LA River was viewed from East Cesar Chavez Avenue bridge. The low-flow channel with recycled water can be seen at the center of the concrete channel. A soft-bottomed section of the LA River was viewed from the Los Angeles River Greenway Trail approximately 3 miles north of downtown. Heavy vegetation and fish were observed in the soft-bottomed section of the river.



Figure 9. View of LA River from the East Cesar Chavez Avenue bridge.



Figure 10. View of the LA River approximately 3 miles north of downtown Los Angeles. The soft-bottomed portion of the trapezoidal channel was heavily vegetated.



Figure 11. View of the LA River approximately 3 miles north of downtown Los Angeles. Fish were observed in the river.

5. Conclusions: The site investigation provided an excellent opportunity to see major features of both the Trabuco Creek fishway project and LA River restoration projects. After financial support from project partners has been obtained for the Trabuco Creek fishway project, Reclamation may continue to provide assistance with technical advice and design review. If funding becomes available for the research proposal “Sustainable Low-flow Ecosystem Features in High Energy Urban Channels”, the travelers will support TSC researchers with idea generation, document review, and/or physical or numerical modeling.

6. Action correspondence initiated or required: N/A

7. Client feedback received: N/A

8. References:

Northwest Hydraulic Consultants. 2015. "Fishway at Metrolink Rail Crossing on Trabuco Creek – Physical Model Studies – Final Technical Report". NHC Ref. No. 600064.

Svoboda, Connie. 2014. "Travel to Northwest Hydraulic Consultants Laboratory". Bureau of Reclamation, Hydraulic Investigations and Laboratory Services, TR-2015-01.

cc:

Doug McPherson (SCAO-1500)

SIGNATURES AND SURNAMES FOR:

Travel to: Trabuco Creek, San Juan Capistrano, CA and Los Angeles River, Los Angeles, CA

Dates of Travel: July 28-30, 2015

Names and Codes of Travelers: Connie Svoboda, 86-68560 and Kent Walker, 86-68560

Travelers:



Connie D. Svoboda, P.E.
Hydraulic Investigations and Laboratory Services

9/11/2015

Date



Kent Walker, P.E.
Hydraulic Investigations and Laboratory Services

9/14/2015

Date

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9/12/2015

Date