



May 20, 2007

To: Mr. Richard Marovich
Putah Creek Streamkeeper

Subject: Impacts of Sediment on Benthic Macroinvertebrates in Putah Creek

Background

The accumulation of sand and silt depletes or eliminates available habitat for benthic macroinvertebrate species that are considered “indicators” of high-quality water and prey for many fish. Over time, continued sedimentation creates a cemented stream bottom that will only support a few highly-tolerant invertebrate species. Inappropriate survey protocol at impacted sites can create a false impression of the “water quality.”



Calineuria californica nymph
collected in Design Channel.

Benthic macroinvertebrates (BMI) have been used officially since the early 1990s in California to delineate environmental conditions and specifically for the purpose of determining water quality in wadeable streams. Restoration in Putah Creek is potentially revealing a site where sensitive invertebrates thrive in the creek water but cannot survive (avoid predators or graze) due to cementation (embeddedness) of the cobble creek bottom.

Accurate documentation of the invertebrate community and the degree of embeddedness is crucial for management and restoration of sediment-impacted streams that have some types of intermittent waterways. Reducing embeddedness is highly important to restoring Lower Putah Creek. Stream scarification might be considered, either by hand if necessary, or mechanical means if appropriate and possible.



Drunella coloradensis adult.
Collected in Design Channel.

Dry Creek and the Design Channel

In November 2005, 1000 feet of Putah Creek was realigned into its historic bed at the confluence of Dry Creek, an intermittent stream, near the City of Winters, Yolo County. Prior to the realignment, I monitored Putah Creek 500 feet downstream from the Dry Creek Confluence for New Zealand Mudsnaills and benthic macroinvertebrates. The invertebrate surveys were unremarkable in species density and composition.

One month after the realignment, storm events caused high water conditions (14,000 CFS) in Putah Creek and significant flows from Dry Creek. By March 2006, I was finding benthic invertebrates in Putah Creek (below the Dry Creek confluence) that have not previously been collected below Monticello Dam. Throughout the summer of



2006, it was common to find various instars of eight mayfly (Ephemeroptera) species and two golden stonefly (Plecoptera) species in the Design Channel. According to available records, none of the “Design Channel Ten” had been previously collected in Putah Creek, below Lake Berryessa.

Surveys in other intermittent waterways above Lake Berryessa and in Putah Creek strongly suggest that the locally rare invertebrates were recruited from Dry Creek during storm events. The significant flows from Dry Creek also scoured the new Design Channel and deposited cobble creating an ideal freestone environment for the sediment-sensitive invertebrates.

Current Conditions (May 2007)

The Design Channel is experiencing an increase in sedimentation possibly due to upstream erosion, lack of significant rainfall, and lack of cobble recruitment from Dry Creek. Ongoing surveys in the Design Channel are revealing that the current invertebrate community is similar to the pre-alignment species composition in Putah Creek. Only one of the “Design Channel Ten” taxa has been documented in the 1000-foot section during 2007. That mayfly nymph, *Epeorus albertae*, was only found under non-embedded cobble.

Recommendations

1. Where possible, reduce sediment entering Putah Creek.
2. Research and develop strategy to reduce embeddedness. It would be appropriate to consider streambed scarification even if permits are required.
3. Continue invertebrate surveys in Lower Putah Creek with an emphasis on the Design Channel (covered by current contract)
4. Invertebrate surveys in the upper Dry Creek / Enos Creek drainage during the next storm season. (Covered by \$17,000 grant from the Rumsey Community Fund)
5. Obtain baseline embeddedness data in the Design Channel (Covered by current contract).

Submitted via e-mail 5/28/07

A handwritten signature in black ink that reads "Ken W. Davis".

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