



January 6, 2011

To: Chris Lee, SCWA
Rich Marovich, LPCCC

Subject: General Update - Solano
System

Report

1. Cobble embeddedness: The embeddedness issue in Putah Creek continues and appears to worsen after storm events. Underwater images on the left show the dramatic impact - and loss of interstitial spaces at the Pickerel site - due to the input of fine sediment. The loss of native invertebrate habitat and aquatic invertebrates appears to be significant.

In the near future, I'll be comparing the embeddedness at Fishing Access # 5, Pickerel Weir, and the Design Channel.

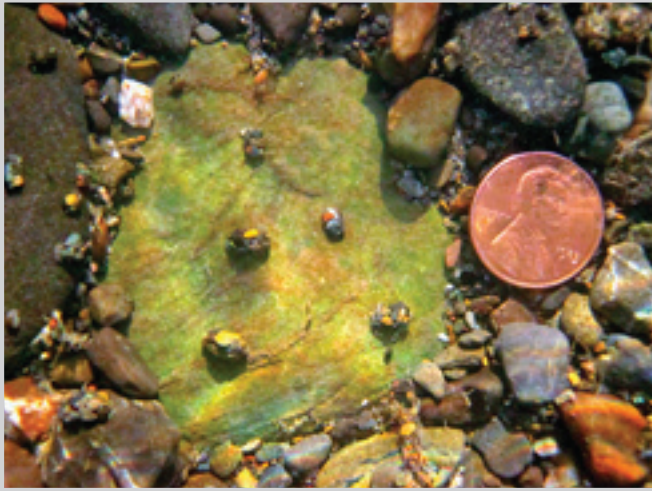
Please see the attached article: "*The Effect of Deposited Fine Sediment on Summer Survival and Growth of Rainbow Trout in Riffles of a Small Stream*" that shows the loss of juvenile trout due to elevated sediment levels.

Invertebrate Stranding

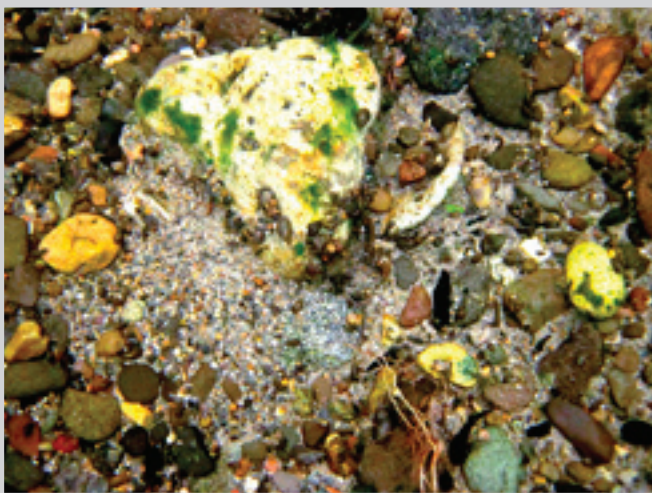
Glossosoma is an important invertebrate prey species for fish and riparian wildlife for several reasons:

1. The disappearance of *Hydropsyche* caddisflies.
2. Downstream range expansion that corresponds to restoration activities.
3. Two distinct populations that emerge though winter months.

In addition, some anglers express concern about stranded *Glossosoma* pupae in the Interdam Reach.



Embedded cobble - Pickerel Riffles (1/5/11)



Embedded cobble - Pickerel Riffles (1/5/11)



Subsurface Image: Glossosoma pupae



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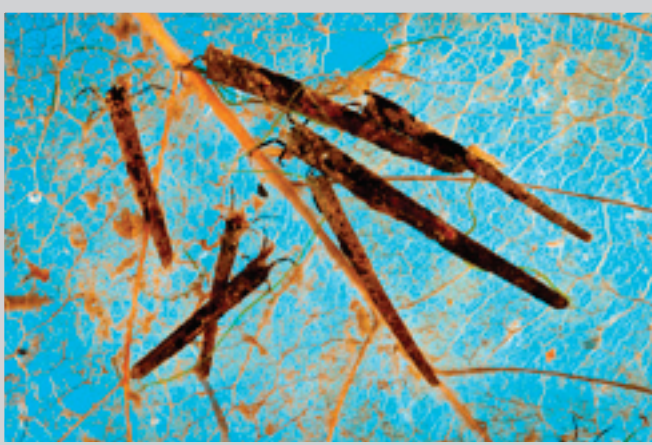
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Glossosoma - Stranded (most emerged) pupae



Close-up: Glossosoma pupae showing many with emergence holes



Caddisfly larvae: Nectopsyche sp.

Studies over the last few years continue to determine that the vast majority (80-90%) of the pupae emerge before the water level is lowered and the subsurface nymph population is rather significant.

Index of Biotic Integrity (IBI)

The majority of mudsnail/ invertebrate surveys in the future will be rated using a modified SWAMP protocol and an Index of Biotic Integrity (IBI). The IBI for Central Valley Perennial Streams uses five metrics to develop a scoring range.

Image on left is a another caddisfly that has become somewhat common in aquatic weedbeds in Lower Putah Creek. Considering some important species, the IBI should give a better measure of the creek than "richness" or "diversity" scores when measure individually.



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Epeorus albertae: Clean water species - dorsal view



Epeorus albertae: lateral view - shows hydrodynamic structure as nymphs prefer clean, rapid flowing water.



New Zealand Mudsnail translocating under water surface

Epeorus albertae

The *Epeorus* mayflies are highly intolerant of organic pollution and are generally considered indicators of clean water. The population of *Epeorus* in the Interdam Reach has increased dramatically over the past few years. I've already found a few small specimens in early 2011. The main population will grow though early spring and hatch by late April.

The only significant change I've noted in the water quality in the Putah / Lake Berryessa drainage was the removal of over 1000 trailers and improvement of the sewage issue at the lake. I'm working with the USBR to locate documentation of the sewage reduction in Lake Berryessa.

The same species of *Epeorus* was common in the Design Channel for a year after the channel relocation. Embeddedness of the interstitial spaces has eliminated the species from that stretch of Putah Creek. Regular mechanical disturbance of the Design Channel might artificially create a healthy interstitial space habitat.

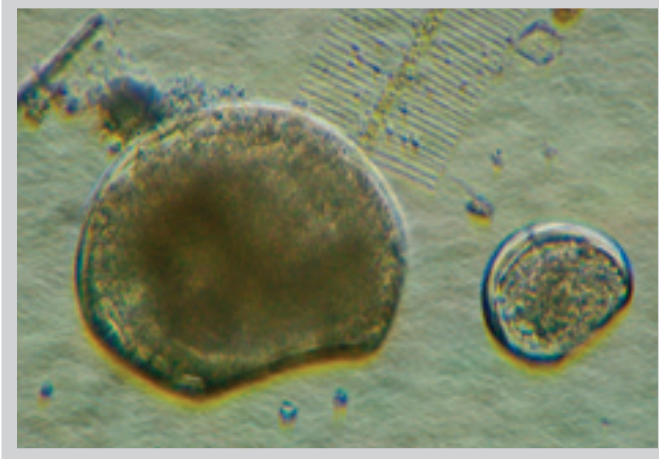
New Zealand Mudsnails Biocontrol

At the "Sixth National New Zealand Mudsnail Conference" - to be held in Moscow Idaho - there will be significant discussion about biocontrol for NZMS. While that concept has monumental issues, the conference organizing committee agrees that the discussion is important for future planning. I am working with the University of California at Santa Barbara to develop the "proper" protocol for monitoring NZMS in the event that biocontrol efforts should ever happen or if a biocontrol agent is accidentally introduced into infested waters by anglers.



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Microscopic Image: Comparison between Asian Clam and Quagga Mussel veligers



Thompson Creek - Road: Matt Straw property - 1/6/11. Note blackberry cover in creekbed.



Thompson Creek - 1/6/11

Dreissena Mussel Veliger Photo Library

The USBR laboratory (Denver) is providing voucher specimens of mussel veligers in ETOH to assist my development of a veliger photo library. The process is authorized by DFG within my Scientific Collection Permit.

Photo comparisons are essential for the identification of Dreissena Mussel veligers. The goal is to prevent false positive mussel determinations within the Solano System.

Thompson Creek Sediment Reduction

Recent discussions with Matt Straw, the owner of a significant section of Thompson Creek, continue to be constructive. He supports my unfunded invertebrate work in Thompson Creek and property access by SCWA staff and consultants to determine potential sediment-reduction ideas.

Submitted 1/11/11

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