

## Abstracts

Thursday, May 1

### Session M2: Assessment of Stream Condition with Macroinvertebrates, Part 2

3:30 – 5:00 pm | Room 262

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#### ***Tracking Macroinvertebrate Trends in Water Quality With Respect to Flow Conditions and Other Variables***

**Jim Martin**

*Adrian College, Adrian, Mich.*

##### **Abstract**

The River Raisin is an important tributary of the western Lake Erie basin. This system has been regularly sampled for invertebrates for 12 years. While about 65% of the basin is agricultural, a good portion of the upper stream is of good biological health. Three reference sites, one from a relatively pristine upriver location, one from near the mouth of the river, and one from one of the more heavily farmed locations, are compared for macroinvertebrate findings with respect to precipitation patterns and stream flow. The greatest variability we have seen in our data through the years is from the more agricultural sites; sometimes searches have yielded insects that are known to be sensitive to disturbance, yet most years they are completely absent. Precipitation patterns are known to strongly influence runoff of sediment and nutrients into the river, and as such influence not only the patterns of macroinvertebrates that we find in this basin, but the amount of nutrients that later find their way into Lake Erie. Knowing the effect of stream flow intensity and duration on macroinvertebrate communities could be useful in the context of implementing best management practices when considering water flow management structures that are abundant in a tiled and drained agricultural landscape.

#### ***Stream Characteristics and Other Considerations for Macroinvertebrate Bioassessment of Puerto Rico Streams***

**James Kurtenbach**

*US Environmental Protection Agency, Edison, N.J.*

##### **Abstract**

Until very recently, macroinvertebrate bioassessment studies of Puerto Rico streams have been limited. This is partly attributed to a lack of development of biological assessment protocols applicable to Caribbean streams. Macroinvertebrate data collected between 1994 - 2011 from 210 stream sites, including the addition of water chemistry, physical habitat, and landscape information have improved the understanding of stream conditions in Puerto Rico. However, information gaps remain on water chemistry, physical habitat, and landscape (natural and anthropogenic) factors which can confound the interpretation of biological condition as determined by macroinvertebrate community data. Also, information associated with invertebrate taxonomy, functional feeding groups, pollution sensitivity, and freshwater-marine linkages continues to be meager. In this paper, the key components of natural stream characteristics and invertebrate biology that are not well understood or unique to Puerto Rico streams are examined. These study objectives have implications for not only current macroinvertebrate bioassessments, but future refinements necessary to achieve more definitive assessments of stream condition in Puerto Rico. Findings from existing Puerto Rico stream survey data could be expanded to guide bioassessment for streams in other Caribbean islands.

#### ***Evaluating the Effects of Spawning Bed Enhancement on Salmon Habitat, Water Quality, and Benthic Communities in a Yuba River Tributary in Northern California***

**Justin Wood, Rachel Durben, Jeff Lauder and Joanne Hild**

*Sierra Streams Institute, Nevada City, Calif.*

## **Abstract**

Deer Creek flows for thirty-four miles in the Sierra Nevada foothills to its confluence with the lower Yuba River. As the last tributary of the Yuba River before the impassable Englebright Dam, Deer Creek provides critical habitat for Central Valley Spring-run, Fall-run, and late Fall-run Chinook salmon and Central Valley Steelhead. There is a lack of suitable spawning gravels and cobbles in Deer Creek due to the presence of upstream dams. Since 2010, Sierra Streams Institute has been undertaking projects to augment the supply of spawning material in Deer Creek, including a spawning bed enhancement effort in 2012. In total, SSI placed approximately 250 tons of spawning material into Deer Creek at three locations spanning 1400 feet of creek. To evaluate how the placed spawning materials are incorporated into the aquatic system, we monitored benthic macroinvertebrates and algae, Chinook salmon and steelhead, water quality, and habitat conditions in three enhanced areas and three unenhanced areas. We observed benthic macroinvertebrates rapidly colonizing the newly placed substrates, and after 10 weeks of monitoring, we observed no difference in algal cover between enhanced and unmanipulated areas. The median pebble size (d50) in each of the enhanced areas was reduced from 77 mm to 22 mm in work area 1, 100 mm to 15 mm in work area 2, and 100 mm to 13 mm in work area 3. Over 75% of the spawning activity occurred in the enhanced work areas, with over three times as many salmon redds in 2012 than in 2011. The data suggest that the stream's spawning capacity had been severely limited by lack of suitable habitat materials. In addition, spawning gravels can be quickly incorporated into the aquatic system by benthic organisms.