

FOSC Steps up Water Quality Monitoring Effort

Water quality is always a concern for the denizens of Sausal Creek, be they human, canine, piscine, or invertebrate. Our water quality monitoring program has grown to include two assessment tools: bioassessment of benthic macroinvertebrates (BMI)—the bugs that live in the creek; and *E. coli* testing and basic water chemistry measurements.

The Bioassessment Team identifies and tallies insects and other invertebrates living in the water and under the rocks to assess the health of the creek. A healthy creek will support a diverse community of invertebrates. This has been a busy summer, with the team conducting three surveys at our Palo Seco site above Highway 13 and two surveys each at several locations in Dimond Park. We are also adding some sampling techniques to our standard “3-kick sample” method. In the 3-kick sample, we use a net to capture insects in a one-square-foot area and repeat it at three locations to get a good average. This method is great for sampling the important EPT-ratio insects, those classified in orders Ephemeroptera, Plecoptera, and Tricoptera. These insects live in riffles—fast-moving, well-oxygenated sections of the creek that run over cobble and rocks. We find much greater diversity at the Palo Seco site—many different kinds of caddisflies and an assortment of stoneflies. These insects are more sensitive to pollution, so their presence indicates that the creek above Highway 13 may be less impacted by pollution.

When the Bioassessment Team resumed the monitoring effort that had been begun in 1998, we didn't really know much about the organisms or where they lived in the creek. We are now less than a year into our study and have begun to notice temporal patterns of insect populations. Some examples:

- The creek experienced a high water event in early April. This photo is from April 13th, looking at the steps just on the other side of the Dimond Park Tot Lot. When a class from Holy Names University conducted a survey on April 18th, they found only 15 organisms in that section of the creek. The scouring caused by the fast and turbulent water knocked down the insect population. But our May survey found 146 organisms, showing that the creek can quickly repopulate and recover from these high water events.



- During our July 2012 survey, we tallied 998 simuliid (blackfly) larvae. Every rock we turned over seemed to have hoards of tiny pulsing blackfly larvae. A week later we began to find the pupal forms—maturing larvae that have begun their metamorphosis into the winged adult form, which takes seven to ten days. We still find blackfly larvae but not nearly in the same numbers.
- At many of the surveys, we noticed two or three different sizes of mayfly nymphs. They belong to the same family, usually Baetidae, but they are from different generations. Mayflies are multivoltine, meaning they take less than one year to complete an entire life cycle. So we are able to see several generations at once. The differences are very clear—the wing pads on the thorax of the mayfly nymph get bigger and more obvious as the nymph molts and grows.

Comparing our findings from spot to spot can be very difficult because conditions can be so different between urbanized Dimond Park and more pristine Joaquin Miller Park. But we can try to “standardize” the creek by providing insects with similar habitats in different parts of the creek. We are going to test rock cages and leaf packs to try to minimize differences along the length of the creek. Rock cages are small wire baskets with an assortment of cobble and rocks inside. Leaf packs are small bags of leaves. Both sampling devices are designed to provide identical substrates for the insects. So the variable becomes the section of the creek in which the devices are placed.

The creek also hosted Fremont High School seniors who are in the Mills Educational Talent Search program. Working with their teacher, Humberto (Beto) Bracho, the students used methods similar to those used by the Bioassessment Team to learn about the creek. Their plan is to design a research project that they can continue throughout their senior year. They also sampled Courtland Creek, just behind Fremont High School in Oakland. It’s only above ground for four or five blocks, and some parts of the creek have been used as dumping sites. But Beto’s students found mayfly and damselfly nymphs in the creek, and adult damselflies darting about in the cool, shady sides of the creek. Even a heavily urbanized area can offer a small respite from hectic urban life and a place where nature still hangs on.

FOSC board member Rob Leidy is leading a team to sample six different locations along the length of the creek for *E. coli* and temperature and water chemistries. The testing for *E. coli* is being performed at the Richmond Environmental Protection Agency (EPA) laboratory according to their protocol. Testing is done at multiple sites for five consecutive weeks during the dry season (now) and during the rainy season. Our sample sites start in Joaquin Miller Park above Highway 13 and go all the way down to Barry Place, just off East 27th Street along Fruitvale Avenue. The creek comes out of a culvert at Barry Place and goes right back into a culvert and continues down to the bay. The photo shows Rob collecting samples below Barry Place—certainly not the pretty creek that runs through Dimond Park. But we observed insect larvae in that section of the creek, so it’s not dead. During the initial sampling, we also saw trout at two of our sampling sites above Highway 580.



We won’t have the results of the *E. coli* testing for a while but will post them in the FOSC newsletter as they become available.

In the future we’d like to extend our capabilities to monitor water chemistries but we need better equipment, such as a robust field meter, which is an expensive item. In the meantime we can do a lot with simple tools. You can help! Do you have entomology textbooks or field guides that you don’t use anymore? Or an inverted microscope? Do you work for a company that might be interested in sponsoring a meter? Please let me know: Kathleen Harris - kathalini@comcast.net.

--Kathleen Harris