Aquatic bugs and healthy streams

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Have you ever looked closely at the variety of small animal life in the creeks throughout the Carpinteria Valley? If you have, you probably noticed a variety of insects, some with menacing forms.

Even if you are familiar with many of the insects in our local creeks you may not have known the significance of a particular insect assemblage, and that the presence or absence of certain groups can be used to make some quick assessments of the water quality and hence the overall health of the streams within the watershed. This is because, like many plants, some aquatic insect groups are much more sensitive to degraded environmental conditions and pollution than others.

Aquatic scientists often sample insect populations to monitor changes in stream conditions. The insects are monitored over time to assess the cumulative effects of environmental stressors such as pollutants and fine sediments such as silt. Environmental degradation resulting from pollution or increases in fine sediments will decrease the diversity of insects found in the stream by eliminating those that are less tolerant to poor water quality.

Let's examine some of common aquatic insect groups that you are likely to see in the Carpenteria Creek watershed. Members of the order Diptera, or true flies, are especially good "bioindicators" of aquatic environmental conditions because, in addition to the attributes of other aquatic insects, they occupy the full spectrum of habitats and conditions. If you have few types of insects or notice only aquatic flies and aquatic worms, then water quality is probably poor. Aquatic worms look like their terrestrial counterparts, and burrow through stream sediments. Aquatic worms can do very well in areas of severe pollution and low oxygen, and are therefore valuable pollution indicators

On the other hand, insects such as the mayfly, stonefly, and caddis fly larvae are sensitive or intolerant to changes in stream conditions brought about by pollutants. These groups are the staple diet for steelhead trout and other native fish. Some of these groups are able to leave for more favorable habitats. Some, however, are either killed by the pollutants or are no longer able to reproduce. Other organisms such as dragonflies, damselflies, and nymphs are called facultative organisms. These organisms prefer good stream quality but can survive polluted conditions more readily then sensitive groups, whose presence generally indicates that you have good water quality.

So what do the bugs in the Carpinteria watershed tell us? A study of the aquatic insects conducted by Jeff Brinkman, Ecological Consultants, Inc. from 2000 to 2003 found that in lower Carpinteria Creek (from approximately the Hwy 101 to a half mile downstream), the diversity of insects was two times lower when

compared to upper Gobernador Creek (from confluence of Steer and El Dorado creeks to a half mile downstream), a tributary of Carpinteria Creek. In Gobernador Creek, the species assemblage included mayflies, stoneflies, caddisflies, beetles, true flies, dragonflies and other bugs, all of which are indicative of a healthy stream. However, in lower Carpinteria Creek the species assemblage was composed of true flies, beetles, mayflies, fairy shrimp, freshwater snails and worms. The results from lower Carpinteria creek signify that something is affecting the water quality of the stream. This may be pollutants in the form of urban run-off (e.g., over-watering lawns, using detergents to wash cars on the street, fertilizers) that flow into the creek, de-stabilized banks sloughing sediment into the creek, a general lack of water flowing in the creek or a combination of all three.

Many communities throughout the country have formed watershed coalitions and "stream teams" which monitor these indicators of stream quality on a regular basis through the use of local volunteers. They function as a sort of "neighborhood watch" for the watershed and can be an effective force to help thinly staffed environmental regulatory agencies combat environmental degradation in our watersheds. If you are interested in becoming involved in such endeavors check out the Carpinteria Creek Watershed Coalition's website at www.carpinteriacreek.org, or the Community Environmental Council's Creek Watchers Program at www.communityenvironmentalcouncil.org/waterprograms/watcher.

Stoneflies (Order *Plecoptera*): **Mayflies** (Order *Ephemeroptera*): **Caddisfly** (Order *Tricoptera*):



Midges (Order *Diptera*): **Aquatic Worms** (Order *Oligochaeta*):


Photos in this article were taken from NYS Department of Conservation's website, Stream Biomonitoring Unit section.