Stream bugs as indicators of water health

Stream bugs or benthic macroinvertebrates are used as indicators of water health. What is a benthic macroinvertebrate and what can they tell us about the health of the local waterways? Let's start with the word *benthic*, which means on the bottom. Then *macro*, means you can see it with your naked eye and do not need a microscope to see it. Last *invertebrate* means it has no backbone. Most people only know these macroinvertebrates as their adult form (winged insects) that they see flying around lake, pond or stream. You see them there because that is where they start their life. Eggs are laid in the water and they go through a complete (egg, larva, pupa, adult) or incomplete (egg, nymph, adult) life cycle. Some emerge as winged insects such as dragonflies, mayflies and crane flies (also called mosquito hawks or mosquito eaters), while others spend their entire life in the water such as the water penny, crayfish, mussels and aquatic worm. Macroinvertebrates are divided into groups based on levels of dissolved oxygen needed for them to survive. Dissolved oxygen is oxygen that is dissolved in the water that is readily available for the macroinvertebrates to use for respiration. This is not only important for our macroinvertebrates but **all aquatic animals**.

Georgia Adopt-a-Stream (AAS), a volunteer water monitoring program, separates macroinvertebrates into three categories – sensitive, somewhat sensitive and tolerant. Macroinvertebrates such as water pennies, stoneflies, caddisflies and gilled snails are in the sensitive category because they require a high level of dissolved oxygen. While blackflies, aquatic worms and leeches are in the tolerant category, requiring little dissolved oxygen. It is important to know that the best waterways have a mix of the sensitive, somewhat sensitive and tolerant macroinvertebrates. Diversity is more important than abundance of a single macroinvertebrate or macroinvertebrates from a single category. When conducting a macroinvertebrate study, macroinvertebrates are collected, identified, counted and then a water quality rating is assigned. A higher number, such as 17 or better indicates a good or excellent waterway. Lower numbers (11 or below) indicate poor to fair overall water quality. These macroinvertebrates are impacted by all the stresses that occur in stream environment, both man-made and naturally occurring.

As part of CCWSA's Environmental Affairs department's watershed monitoring, ten sites are monitored about every other year using the state of Georgia's macroinvertebrate protocol. The waterways that are monitored are Shoal Creek, Canton Creek, Chicken Creek, Copper Sandy Creek, Little River, Mill Creek, Noonday Creek, Rubes Creek, Soap Creek and Toonigh Creek. The 2022 results indicated that our waterways are fair to poor. This, however is not the whole picture. The biological study (habitat, fish and macroinvertebrates) indicates improving conditions in habitat, macroinvertebrates and fish from 2017 through 2022. Specifically, Canton Creek, Copper Sandy Creek, Little River, Noonday Creek, Rubes Creek, Shoal Creek, Soap Creek and Toonigh Creek all have improving conditions in macroinvertebrate populations.

We monitor for macroinvertebrates because they are fantastic bioindicators, they are not very mobile and they are relatively easy to catch, view and identify. As citizens you can be a part of monitoring the stream habitat and macroinvertebrate population. Georgia AAS macroinvertebrate monitoring volunteers are trained, quality assurance/quality control tested and then adopt a location to monitor once a quarter (4x per year). There are few things that excite kids and adults alike more than flipping rocks and finding what lives beneath. This is a great opportunity to be an active part of your community. If you are interested in learning more contact Lori Forrester – lori.forrester@ccwsa.com.