



Smith Creek
Water Quality Monitoring Group

INSECTS AND STREAM QUALITY

How clean is your stream?

You can answer that question by counting the insects in your stream. Many stream-dwelling organisms are sensitive to changes in water quality. Their presence or absence can serve as indicators of environmental conditions. Macro invertebrates (visible, spineless animals), especially insects, are easy to find. By following the technique below and filling out the Aquatic Survey Sheet, you can diagnose your stream's water quality.

Kick-Net

The equipment required includes a kick-net (a fine mesh net with a supporting pole on each side) or an old window screen with no holes, forceps, a clear plastic container, several jars for collecting, and a microscope or magnifying glass.

1. Select a riffle typical of the stream, that is, a shallow, fast-moving area with a depth of 3 – 12 inches and stones which are cobble-sized (2 – 10 inches) or larger.
2. Place the kick-seine or screen at the downstream edge of the riffle. Be sure that the bottom of the seine or screen fits tightly against the stream bed (you may want to use rocks to hold the net down tightly), so no insects can escape along this point. Also, don't allow any water to flow over the screen top. This too could allow insects to escape.
3. Disturb the streambed for a distance of 3 feet upstream of the kick-seine. Brush your hands over all rock surface to dislodge any attached insects. Stir up the bed with hands and feet until the entire 3 foot square area has been worked over (Remember to be careful of your hands. Watch for objects that might cut). All detached insects will be carried into the net. For 60 seconds, and no longer, kick the streambed with a sideways motion of the net. This may bring up a few ground dwellers.
4. When step 3 is completed, remove the net with a forward scooping motion. The idea is to remove the net or screen without allowing any of the critters to be washed from its surface.
5. Place the net on a flat, light-colored area. Using forceps, pick all of the creatures from the net and place them in a pan, or just wash the creatures into a light-colored bucket where they may be easily seen. Any creatures moving, even

- if it looks like a worm, is part of the sample. (Do not miss snails and clams.) Look closely since most of these organisms are only a fraction of an inch long.
6. Once all animals have been removed from the net (excluding any fish or other vertebrates – throw these back quickly so they might survive the stress of being out of their habitat), count the total number. Then separate them into look-alike groups. Use body shape and number of legs and tails primarily since the same family can vary some in size and color.
 7. If the stream seems to have a problem, for example, no bugs are found, take a quick second sample from another spot, preferably a riffle. If your results are similar, you might want to check another spot about a quarter mile upstream. When you find a place where the variety of benthic creatures is greater and the numbers are more balanced, then you know the problem occurs between that spot and where you last tested downstream.
 8. Sometimes, it can be difficult to locate a riffle. For example, in an area where there is excessive sand, boulders and rocks are often completely covered. In these cases, remember that a riffle is an area of turbulence. It may be composed of rocks, logs, or even an old car! Look for large stationary objects. Things which have “weathered” in the stream a while. (The critters need time to make these objects home.) Then kick around them much as you would rocks. However, if the substrate is covered with sand or composed entirely of bedrock and a “kickable” riffle does not exist, you can use the bank habitats. For example, place your net downstream of a submerged tree or grass roots and kick in and around them. Make sure it is an area where water is flowing or there is current.

Sweep Net Survey

Most people are familiar with the dip nets used for fishing, A sweep net is similar in construction, but the mesh of the net is smaller. In fact, the net mesh found on a sweep net is smaller than the mesh net used on most kick-nets.

If your group has the money, you can order sweep nets from scientific supply houses, however, a very adequate net can be simply and inexpensively constructed by arranging screen mesh over an old dip net frame. This net will not be ideally correct, but it will be useful for collecting a wide variety of creatures. **Small aquarium dip nets can be used for sampling an area many times in a short period (i.e. student sampling over several periods during a week).**

To perform a sweep net survey, take your net and sweep around the banks of your stream. Sweep in and around tree roots and vegetation. Then, stir the sediment near the stream bank with your foot and use the sweep net to scoop up the creatures jarred loose. Dragonflies, damselflies, mayflies, and snails will often be found in a sweep net sample.