MACROINVERTEBRATE STUDY

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One of the main concerns of BRASS is erosion along the banks and the resulting sediments in the river bed. The river association has tried to stabilize banks by planting willows and has cribbed banks along certain sections of the river. These actions help to reduce erosion and sediment.

Now BRASS is looking at the effects of sediment on the living organisms in the river. We are starting by conducting a study on the macroinvertebrates of the Boquet River. Now, just what are macroinvertebrates? Why are they important? And how are we studying them?

Macroinvertebrates: It helps if you break the word apart. "Invertebrates," if you remember your biology, are animals without backbones. They are things like worms and snails and insects. "Macro" means big. In river studies we use a screen with a standard mesh size; anything that is big enough to be held back as we pour the animals onto the screen is classified as a macroinvertebrate. The size distinction is arbitrary, but if all scientists use the same size mesh, it allows us to compare our work. Most of the macroinvertebrates live on the river bottom, often in the spaces between rocks. To collect them, we place a net and kick at the rocks on the river bottom. This dislodges the creatures living in between the rocks and they are swept downstream into the waiting net. These samples of macroinvertebrates are called "kick net samples."

Macroinvertebrates of the Boquet: Last winter we started taking samples. In the laboratory we identified the creatures to the level of family. Identification beyond that, to the level of genus and species, is very difficult and requires a specialized expert. Fortunately, the NYS Department of Environmental Conservation has such an expert, Larry Abele, and he has been willing to help us complete the identification. So far, we have 25 species identified, which is perhaps one quarter of those we will ultimately find. Interestingly, one was a species never before found in the State. Already we have added to the knowledge about not only our own river, but of the State's rivers as a whole.

There are a wide variety of groups involved in our initial 25 identifications. There are clams and snails and crayfish, but the most common macroinvertebrates are insect larvae. Among these larvae are a variety of groups such as beetles, dragonflies, craneflies, and caddisflies. But, the two most abundant groups are the stoneflies and the mayflies. Not only are these two groups the most numerous in terms of the number of species, they are also the most numerous in terms of the number of individuals.

Importance of Macroinvertebrates: A basic reason of importance is that macroinvertebrates, especially the insect larvae, are a major link in the food chain of the river ecosystem. A food chain shows where the food in a system comes from and where it goes. An example of a food chain, often given in textbooks, is:

grass ==> deer ==> mountain lion

In this example the sun's energy is fixed by the grass, which is eaten by the deer, which is - in turn - eaten by the mountain lion. A food chain for a river such as the Boquet is:

dead leaves ==> bacteria and fungi ==> insect larvae ==> fish

The food energy of the sun comes into the river as dead leaves from the trees along the banks. The leaves are broken down by bacteria and fungi, which are eaten by insect larvae. The food energy of the system is funneled to the fish (which is what most people are interested in) almost entirely through the insect larvae. Without the insect larvae, the fish would starve and the river's ecosystem would collapse. This, alone, is reason enough to study the macroinvertebrates, though as ecologists we could add more including the fact that the creatures are fascinating.

The Macroinvertebrate Study: As mentioned earlier, we are interested in the effects of sediments on the macroinvertebrates. Since these creatures live in the spaces between the rocks on the stream bottom, we wondered (which is plain talk for the scientist's hypothesis) if the Boquet's sediments are affecting the macroinvertebrates.

In earlier studies, BRASS identified heavily embedded sites where sediments have filled a large percentage of the spaces between the rocks, and other areas with slight sediment embeddedness. The macroinvertebrate study makes use of the past studies by picking pairs of sites which are matched in every aspect except the amount of sediment. Macroinvertebrates are collected with kick net samples, as described earlier. We kick the same number of square foot areas, for the same amount of time, at each site. Then we compare the results.

Ideally, we would like to know the number and size of each of the species living in an area of the river bottom. This is possible, but very complicated. It is hard to kick in a strictly defined area of river bottom, and it is hard to determine how many creatures get into the net and how many are left behind. To get around this problem, ecologists have devised ways of making sense of their samples by concentrating on the relative numbers of different species, rather than on the

absolute numbers. They use relative numbers to calculate indices with which they can then compare sites.

Right now our study is gathering the samples from the paired sites. Next comes the sorting and identification of all creatures collected. Lastly, we can calculate the indices and compare the pairs of sites.