

Water bugs

There is a whole world of life in rivers and lakes. Some of the tiny animals living in the water **are benthic**, meaning they live in the bottom of the waterbody. Some are **MACROINVERTEBRATES** because they are **large and easy to see (macro)** and because they have **no backbone (invertebrate)**. The most common of these creatures include insects, clams, snails, **crayfish, and worms**. Some live their whole lives in the water, and others leave the water as adults to feed and reproduce.

Macroinvertebrates are important as food to all the creatures living in the water. Some are considered by scientists to be **indicator species** and are a way of telling whether or not a river or lake is polluted. In rivers, macroinvertebrates live attached to rocks and plants where there is fast-flowing water. They are good indicators of water quality because they do not move around and are easy to collect. The moving water gives them food and oxygen. If the water is polluted, there is less food **and oxygen** for the aquatic macroinvertebrates. If the water has critters that can't live in polluted water that is a good indication that the water is clean and of high quality. If there are mostly *pollutant-tolerant* critters in the water, there is a chance that the water is polluted and only those types of species can survive.

In lakes, where there is not fast-flowing water, the dynamics are slightly different. Indicator species in rivers are not necessarily as "telling" (in other words, if certain macroinvertebrates are present, water quality is indicated by their presence **in a river** but not in a lake) as in lakes where the waters are relatively still.

Some stream-bottom macroinvertebrates cannot survive in polluted water. **Others can survive or even thrive in polluted water**. In a healthy stream, the stream-bottom community will include a variety of pollution-sensitive macroinvertebrates. In an unhealthy stream, there may be only a few types of nonsensitive macroinvertebrates present. Stream-bottom macroinvertebrates provide information about the quality of a stream over long periods of time. It may be difficult to identify stream pollution with water analysis, which can only provide information for the time of sampling. **Even the presence of fish may not provide information about a pollution problem because fish can move away to avoid polluted water and then return when conditions improve. However, most stream-bottom macroinvertebrates cannot move to avoid pollution.**

Macroinvertebrates That Are Sensitive to Pollution

Found in Good Quality Water



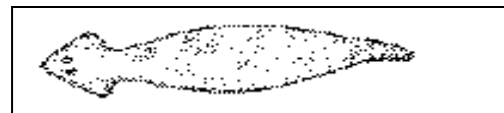
Stonefly



Riffle Beetle Adult

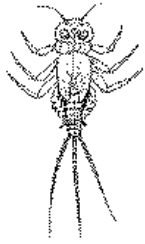


Gilled Snail

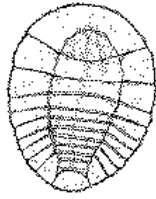


Planarian

Water bugs



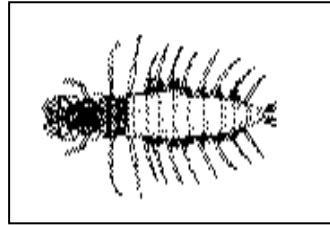
Mayfly



Water Penny



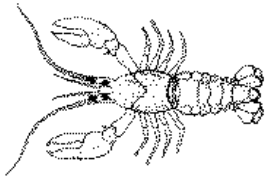
Caddisfly



Hellgramite

Macroinvertebrates That Are Somewhat Sensitive to Pollution

Found in Good or Fair Quality Water



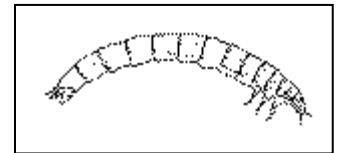
Crayfish



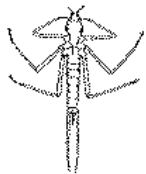
Alderfly



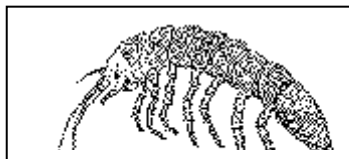
Crane Fly



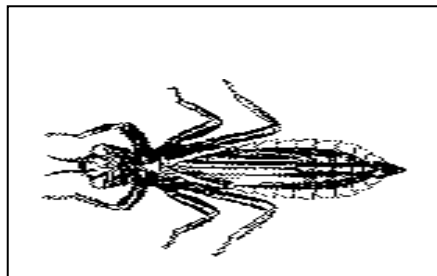
Riffle Beetle



Damselfly



Sowbug



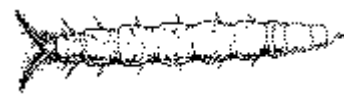
Dragonfly



Scud

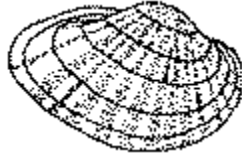
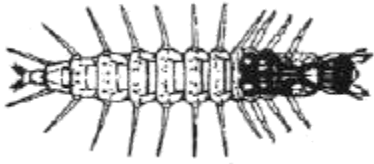


Whirlig Beetle Larva



Watersnipe Fly

Water bugs



Fishfly

Clam or Mussel

Macroinvertebrates That Are Tolerant of Pollution

Found in Any Quality Water



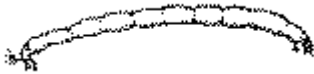
Aquatic Worm

Lunged Snail



Black Fly

Leech



Midge Fly