**Introduction**

The waters of West Fork White River are home to a wide assortment of animals. Some of them are fairly easy to see, such as bass, turtles, and fish. But by far the most abundant animals in the creek are living on the stream bottom, where they are not easily seen. These animals are called aquatic macroinvertebrates, and they are at home among the rocks and logs on the bottom of streams.

Macroinvertebrates are interesting for several reasons. Their specific behaviors include being held-back net builders, free-floating opportunists, and aggressive hunters. These animals are busy feeding themselves from a range of food in the stream and, in turn, they are an important food source for fish. Many types of flying flies and tails look like macromacroinvertebrates. They are also good indicators of the overall health of a stream. The number and variety of macroinvertebrates is about the quality of both the water and the nearby surroundings.

The West Fork of the White River begins in Lynn, IN, near Winchester. This warm water stream meanders throughout Randolph County before entering Delaware County, passing through Muncie, for approximately nine miles. A majority of this stretch is sampled annually by the Bureau of Water Quality to assess the health of White River fish, macroinvertebrates, and mussel communities. Let’s take a look at some of the clean water species they encounter during their biological monitoring.

**What do macroinvertebrates do in the stream?**

Macroinvertebrates spend their time looking for food and staying safe from predators. They have many different adaptations to accomplish these tasks and occupy locations in the stream where they function best. Some hang tightly to rocks while others swim freely or crawl around. Some build cases to protect themselves, and others make nets to catch food. Macroinvertebrates are a very diverse group of animals.

**What exactly is a macroinvertebrate?**

Aquatic benthic macroinvertebrates include crayfish, mussels, snails, worms, leeches, and numerous insects. Aquatic insects refer to the stream environment where these animals live; benthic refers to the bottom of the stream. Macroinvertebrates are visible with the naked eye; and invertebrate means these are animals without a backbone. Aquatic macroinvertebrates develop underwater. Some, like mussels and leeches, never leave the water habitat. In contrast, insect macroinvertebrates use the water as a nursery, developing underwater for weeks or even years before they emerge from the water as an adult. The adult phase is relatively short, lasting from only a few hours to a month or so. For example, a dragonfly nymph spends months developing underwater before crawling out of the water to spend a few weeks as a winged adult that will lay the eggs for a new generation.

**How can these animals live underwater?**

Macroinvertebrates, like all animals, require oxygen to live. Most types of fish fully underwater use gills to obtain oxygen dissolved in the water. The gills are continuously moved back and forth to “capture” oxygen. Other individuals utilize breathing tubes that extend from their bodies into the water surface. Still others get their oxygen by attaching an air bubble to the body for an oxygen supply while they are swimming, similar to a diver with a scuba tank.

**Resources**


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Photographs: Julie Speelman, PhD student in Aquatic Biology, Purdue University. West Lafayette, Indiana. Laura Bowley, Muncie Sanitary District Bureau of Water Quality, Muncie, Indiana.

Check out our other brochures to learn more about the many creatures that call White River home.
Macroinvertebrates of West Fork White River, Delaware County, Indiana

**INTOLERANT**

- *Mayfly Nymph*  
  Grows up to 4–15 mm

- *Dobsonfly Larva*  
  Grows up to 25–90 mm

- *Water Penny*  
  Grows up to 3–10 mm

- *Caddisfly Larva*  
  Grows up to 10–30 mm

- *Blood Midge Larva*  
  Grows up to 2–30 mm

- *Dragonfly Nymph*  
  Grows up to 20–68 mm

- *Damselﬁl Nymph*  
  Grows up to 10–40 mm

- *Crayﬁsh*  
  Grows up to 10–150 mm

- *Leech*  
  Grows up to 4–450 mm

- *Left-Handed Snail*  
  Grows up to 5–20 mm

**FAIRLY TOLERANT**

- *Black Fly Larva*  
  Grows up to 10–30 mm

- *Midge Larva*  
  Grows up to 2–18 mm

- *Blood Midge*  
  Grows up to 4–18 mm

- *Mosquito Larva*  
  Grows up to 5–20 mm

- *Water Penny*  
  Grows up to 3–15 mm

**MODERATELY INTOLERANT**

- *Mayfly Nymph*  
  Grows up to 4–15 mm

- *Dobsonfly Larva*  
  Grows up to 25–90 mm

- *Water Penny*  
  Grows up to 3–10 mm

- *Caddisfly Larva*  
  Grows up to 10–30 mm

- *Blood Midge Larva*  
  Grows up to 2–30 mm

- *Dragonfly Nymph*  
  Grows up to 20–68 mm

- *Damselﬁl Nymph*  
  Grows up to 10–40 mm

- *Crayﬁsh*  
  Grows up to 10–150 mm

- *Leech*  
  Grows up to 4–450 mm

- *Left-Handed Snail*  
  Grows up to 5–20 mm

**VERY TOLERANT**

- *Black Fly Larva*  
  Grows up to 10–30 mm

- *Midge Larva*  
  Grows up to 2–18 mm

- *Blood Midge*  
  Grows up to 4–18 mm

- *Mosquito Larva*  
  Grows up to 5–20 mm

- *Water Penny*  
  Grows up to 3–15 mm

Intolerant macroinvertebrates need cleaner water. Very Tolerant macroinvertebrates can live in polluted water.

Macroinvertebrates are good indicators of overall stream health for several reasons. They live in the water for all or most of their lifespan. They are small animals and do not move very far, which makes them easy to collect and examine. The most important reason is that macroinvertebrates have varying sensitivity to water pollution. Some macroinvertebrates do not tolerate pollution and will only live in clean water. Others can tolerate some pollution. Still others are not sensitive and will tolerate pollution as a normal condition.

One method for evaluating the health of the stream is to collect macroinvertebrates and sort them into groups based on their pollution tolerance. If most of the collected macroinvertebrates are in the group that does not tolerate pollution, the water is clean. If the collection shows mostly macroinvertebrates that tolerate pollution, the water may be polluted. Macroinvertebrates sampling for water quality evaluation is used by a wide range of investigators from research scientists to school groups.

These photographs are macroinvertebrates that can be found in West Fork White River in Delaware County, Indiana, grouped according to their pollution tolerance. Cleaner water increases macroinvertebrate diversity (the number and types of animals present), while polluted water decreases macroinvertebrate diversity.

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