

Visual guide to common macroinvertebrates

Flathead mayfly (L)



Spiny-crawler mayfly (L)



Brush-legged mayfly (L)



Minnow mayfly (M)



Prong-gilled mayfly (L)



Burrowing mayfly (M)



Common stonefly (L)



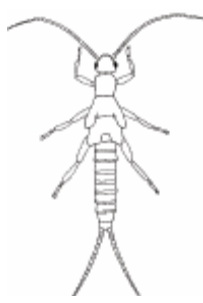
Green stonefly (L)



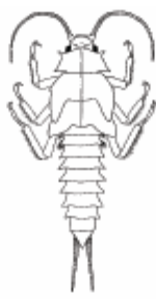
Brown stonefly (L)



Small winter stonefly (L)



Giant stonefly (L)



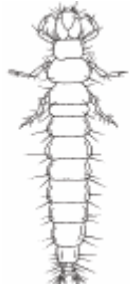
Common netspinner (M)



Finger-net caddisfly (M)



Free-living caddisfly (L)



Northerncase caddisfly (M)



Case is constructed of a wide variety of materials; it takes on many sizes, shapes and styles.

Humplescace caddisfly (L)



Case is constructed using strips of plant materials; it is usually elongated.

Saddlecase caddisfly (L)



Case is constructed using small pebbles; it is usually saddle shaped.

Longhorncase caddisfly (L)



Case is constructed using a variety of materials (plants are common); it is usually elongated.

Dragonfly (M)



Damselfly (H)



The purpose of this guide is to provide images and common names of macroinvertebrates that volunteers may collect from our streams and rivers. This is not a complete list and is only meant to distinguish between the most common orders and a few representative families.

Insect Groups

Order Ephemeroptera: **Mayflies**

Three pairs (6 total) of legs; one hooked claw at the end of each leg; gills on the abdomen (may be covered by plates); 2 or 3 tail filaments and 2 short antennae. (S – L)

Order Plecoptera: **Stoneflies**

Three pairs of legs (6 total); 2 hooked claws at the end of each leg; no gills on most of the abdomen but may have gills on the legs, thorax and upper abdomen; 2 tail filaments and 2 long antennae. (M – VL)

Order Trichoptera: **Caddisflies**

Three pairs of legs (6 total); segmented grub-like body; some kinds may have gills along lower and upper portions of the abdomen; small hair-like tails or hooks. Case builders may be enclosed in a case (retreat) that they construct using stream bottom materials such as pebbles, sand grains, woody debris, pieces of plant material or some combination; others construct a net, which consists of materials held together by a silk-like thread. **Note:** The **free-living caddisfly** does not build a retreat. The case builders often construct a specific case that can sometimes be used in their identification. The **common netspinner caddisfly** is more tolerant than most of the group. The abundant gills on the underside of their body, their filamentous tails and their particular motion can distinguish them. (S – L)

Order Megaloptera: **Alderfly and Fishfly**

Three pairs of legs (6 total); filaments along the body starting just below the legs; variable tails at the end of the abdomen. **Alderfly** has a long tapered tail; **hellgrammite** and **fishfly** have a hooked-tail. They also have gill-tufts under each of their filaments, fishflies and alderflies do not. All members of the group have large pinching jaws on the head. (M – VL)

Order Coleoptera: **Beetles**

Three pairs of legs (6 total); mainly rounded or oval shape as adults; a few kinds have tails hooks or filaments, hard bodies and visible wing-pads. The most commonly encountered beetles are the **riffle beetle**, which is a small dark beetle and **water penny**, which looks like a penny. The whirligig beetle larva may have many filaments along their bodies similar to fishflies. (VS – L)

Order Odonata: **Damselflies**

Three pairs of legs (6 total); long, thin abdomen; large eyes; extended lower lip; 3 fan like structures, which are actually their gills, at the end of the abdomen. (M – L)

Order Odonata: **Dragonflies**

Three pairs of legs (6 total); extended lower lip; large eyes; rounded or extended abdomen; no gills on the abdomen; no tails but may have knobs or points on the abdomen that resemble tails. (M – VL)

Low (L)				Moderate (M)				High (H)		
0	1	2	3	4	5	6	7	8	9	10

Tolerance ratings

< 5	5 - 15	15 - 30	30 - 50	> 50
(VS)	(S)	(M)	(L)	(VL)

Size ranges (mm)

Visual guide to common macroinvertebrates

Riffle beetle adult (M)



Riffle beetle larva (M)



Alderfly (M)



Hellgrammite (L)



Water penny (L)



Black fly (M)



Crane fly (M)



Watersnipe fly (L)



Non-biting midge (H)



Biting midge (H)



Dixid midge (H)



Dance fly (M)



Non-Insect Groups

Crayfish (M)



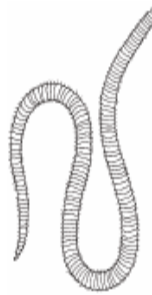
Scud/Sideswimmer (M)



Aquatic sowbug (H)



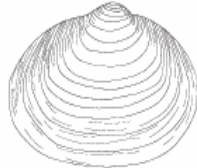
Aquatic worm (H)



Leech (H)



Clams (M)



Mussels (L)



Snails (M)



Order Diptera: True flies

No legs or may have structures that resemble legs (false-legs); mainly segmented grub-like or worm-like bodies; tiny hair-like tails, lobes, tentacles or other structures at the end of their abdomen (or no tails); often a distinct head can be seen, but on other kinds no head is visible. Many different kinds of flies are encountered, the more common kinds include the **crane fly**, most have no legs, a plump segmented body and numerous tentacles or bulbous structures; **watersnipe fly** has false legs and a forked hooked tail, looks similar to a caterpillar; **black fly** has a bowling pin or vase shape and fan-like structure on their head; **non-biting midge** is usually very small with a thread-like or worm-like body (some are red in color) with a very erratic wriggling motion. There are many more Dipterans that are sometimes collected, but the only additional images of the biting midge, dixid midge and dance fly are shown here. (VS - L)

Non-Insect Groups

Sub-phylum Crustacea

More than three pairs (more than 6 total) of legs; claws on the first several pairs of legs, which may be enlarged; long antenna. This group includes the **crayfish**, which looks like a small lobster, **scud** also called sideswimmer resemble a shrimp and are flattened from side to side, and the **aquatic sowbug** resembles a pill bug and are flattened from top to bottom. (M - VL)

Phylum Annelida: Worms and Leeches

Worm-like appearance; no legs and many segments along the entire length of the body. This group includes the **aquatic worm** and **leech**. The suckers on both ends of their body distinguish the leeches from other annelids. **Flatworms** are also sometimes collected, but they are not truly Annelids, they belong to the phylum Platyhelminthes. An image of the flatworm is not provided. (M - VL)

Class Bivalvia: Clams and Mussels

Two cup-shaped shells connected by a hinged structure; the shell is made of calcium carbonate and is usually very strong and hard to open. **Mussel** has an oblong rough, often dark color shell. Most **clams** are smaller and have a rounded shell. The Asian clam can be distinguished from the native pea clam by the raised ridges; pea clams are often smaller and its shell feels smooth to the touch. (S - L)

Class Gastropoda: Snails

Single coiled shell that mostly opens to the right when the point is held facing towards you. **Operculate snails** have an operculum "a door that shuts the shell" and are commonly known as gilled snails. Some have shells that open to the left when the point is held facing towards you; shells also may be rounded flat or coiled. Many of these are **non-operculate snails** that do not have an operculum and are commonly known as pouch or pond snails. (S - L)

Note: The image sizes are not proportional nor do they represent actual sizes; in some cases colors can be variable. Color and size should not be used as distinguishing characteristics when attempting to identify benthic macroinvertebrates. Not all families that may be collected are shown here. Most of the images are drawn in lateral or top views. Images courtesy of the University of Minnesota's Water Research Center; they appear in the Guide to Aquatic Invertebrates of the Upper Midwest. Learn more at: <http://www.dep.wv.gov/sos>

< 5	5 - 15	15 - 30	30 - 50	> 50
(VS)	(S)	(M)	(L)	(VL)

Size ranges (mm)