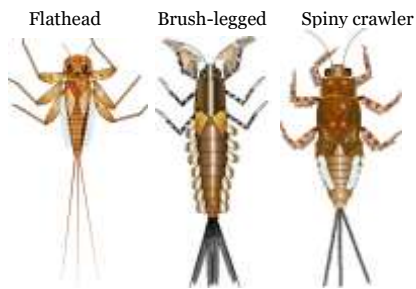


## WV Save Our Streams BMI field guide



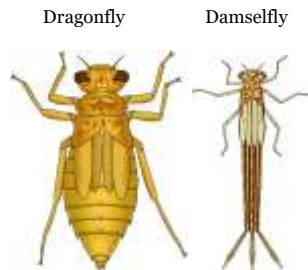
Small minnow mayfly



### Mayflies

Order **Ephemeroptera** (*m*): Three-pairs of legs with a single hook at the end; mostly three but sometimes two tail filaments; gills attached to the abdomen, which may be covered and difficult to see. Mayflies exhibit several types of movements (or habits); swimmers, clingers, crawlers, and burrowers. (L-M)

Illustrated above left to right: *Heptageniidae*, *Isonychiidae* and *Ephemerellidae*.



### Dragonflies and Damselflies

Order **Odonata** (*m*): Three-pairs of legs; large eyes; long spoon-like jaws; no tails on the abdomen. **Dragonflies** sub-order *Anisoptera* have a broad shaped abdomen, while the **Damselflies** sub-order *Zygoptera* abdomen's is much narrower. Damselflies gills are attached to the end of the abdomen, they look like tails. (L-H)



### Beetles

Order **Coleoptera** (*m*): Three-pairs of legs; body usually covered by a hard exoskeleton. The most commonly collected is **Water penny** family *Psephenidae* and **Riffle beetle** family *Elmidae*. Other adult/larvae beetles are occasionally collected. (L-M)

**What is an insect?** An insect is an invertebrate (an animal with no spine) that has three-pairs of legs (except *Diptera*) and three body divisions (head, thorax and abdomen); the head is the location of the mouth, antenna and eyes; thorax is the site for the legs and wing pads; and the abdomen, has a variety of structures attached such as filaments, gills and tails. Note: Multiple families may be collected within certain groups. These are indicated by (*m*).



### Stoneflies

Order **Plecoptera** (*m*): Three-pairs of legs with two-hooks at the end; two tail filaments; no gills attached to the abdomen but some kinds may have gills near the top of the abdomen; gills if visible, mostly on the legs and thorax. (L)

Illustrate above left to right: *Pteronarcyidae*, *Perlidae*, *Capniidae* and *Peltoperlidae*.



### Fishflies and Alderflies

Order **Megaloptera**: Three-pairs of legs; large pinching jaws; eight-pairs of filaments attached to the sides of the abdomen. **Fishflies** family *Corydalidae*, have a two-hooked tail, whereas **Alderflies** family *Sialidae* have a single tapered tail and are usually much smaller and lighter in color. (L-M)

### True flies

Order **Diptera** (*m*): The body is segmented with some features along the body, at the head or tail regions. **This order contains insects without fully developed legs in the larval stages.** Dipterans are a very diverse order with many varieties. Only a few commonly encountered *families* (kinds) are described.

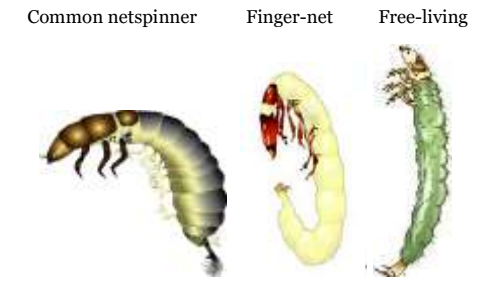
Note: A **tolerance scale** for the BMIs is at bottom of page two. The tolerance **range** is provided in the descriptions for each group.



### Case-building caddisflies

Order **Trichoptera** (*m*): Grub-like soft body and a hard head; Three-pairs of legs on the upper third of the body; tail is small, usually forked and sometimes fringed with hairs; gills are scattered on the underside of the abdomen. The case is a solid structure made of a variety of streambed materials held together by silk. (L)

Illustrated above left to right: *Brachycentridae*, *Limnephilidae* and *Glossosomatidae*



### Net-spinning caddisflies

Order **Trichoptera** (*m*): Similar characteristics to case-builders but the abdomen usually has more abundant gills, especially Common netspinners. The retreat is made of a variety of streambed materials loosely held together by fine strands of silk. Free-living caddisfly does not build a case or retreat. (L-M)

Illustrated above left-right: *Hydropsychidae*, *Philopotamidae* and *Rhyacophilidae*.



### Non-biting midge

Order **Diptera** family *Chironomidae*: Segmented body with a visible head; two leg-like projections at the front and rear. Sometimes they are bright **red** in color. (H)

**WV Save Our Streams BMI field guide**



**Crane fly**

Order **Diptera** family *Tipulidae*: No legs, no visible head; plump body with lobes along the segments; may have structures that look like tentacles, lobes or one bulb at the end of the body. (M)



**Black fly**

Order **Diptera** family *Simuliidae*: Body has a bowling-pen shape (lower is wider than the upper); there are multiple brushes/fans on the head and a ring of hooks on the abdomen. (M)



**Watersnipe fly**

Order **Diptera** family *Athericidae*: Plump body, looks like a caterpillar; on the underside there are structures similar to legs but are not segmented; the tail is forked and fringed with hairs. (L)



**Crayfish**

Class **Crustacea** order *Decapoda*: Five pairs of legs, the first two usually have large claws; large flipper-like structure at the end of the abdomen. (M)



**Scud/Sideswimmer**

Class **Crustacea** order *Amphipoda*: Seven pairs of legs, the first two may be claw-like; body is somewhat higher than it is wide. Usually swims with a sideways motion. (M)



**Aquatic sowbug**

Class **Crustacea** order *Isopoda*: Seven pairs of legs, the first two may be claw-like; very long antenna; body is wider than it is high, giving the animal a fairly flattened appearance. (H)

Mussel

Clams



**Clams and Mussels**

Class **Bivalvia** (*m*): Fleshy body enclosed between two-hinged shells; the shape and ridge spacing of the shells can determine different kinds. **Mussels** are usually larger than **Clams** and have dark colored oblong shells. (L-M)



**Operculate snails**

Class **Gastropoda** sub-class *Prosobranchia* (*m*): Fleshy body enclosed by a single shell, which is usually coiled in an upward spiral. The opening of the shell is covered by an operculum (door). (L-M)



**Non-operculate snails**

Class **Gastropoda** sub-class *Pulmonata* (*m*): Fleshy body enclosed by a single shell, which is sometimes coiled upward but also may lie flat or have a conical shape. The opening of the shell is not covered by an operculum. (H)



**Aquatic worms**

Phylum **Annelida** class *Oligochaeta*: Body is long with numerous segments along its entire length; has no visible head or tail. (H)



**Leeches**

Phylum **Annelida** class *Hirudinea*: Body is long and thin or slightly widened; 34-segments along its length, but there appears to be many more. (H)



**Flatworms**

Class **Turbellaria**: Soft elongate body without segment; head triangular shaped with eyes on top, which give the animal a cross-eyed appearance. (H)

**ID tips**



Identification is easier when viewed in the same orientation as the illustration. Most illustrations are drawn in top and side views, except the water penny which is an underside view. **Morphological** features are the basis for all identification; size and color are variable, often influenced by environmental factors.

This BMI field guide will help identify commonly collected classes, orders, and a select few families. You should always use to a more advanced guide for verification of most family-level identification. With practice, you will be able to identify a wide variety of BMIs in the field.

<http://www.dep.wv.gov/sos>

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

**Tolerance scale**