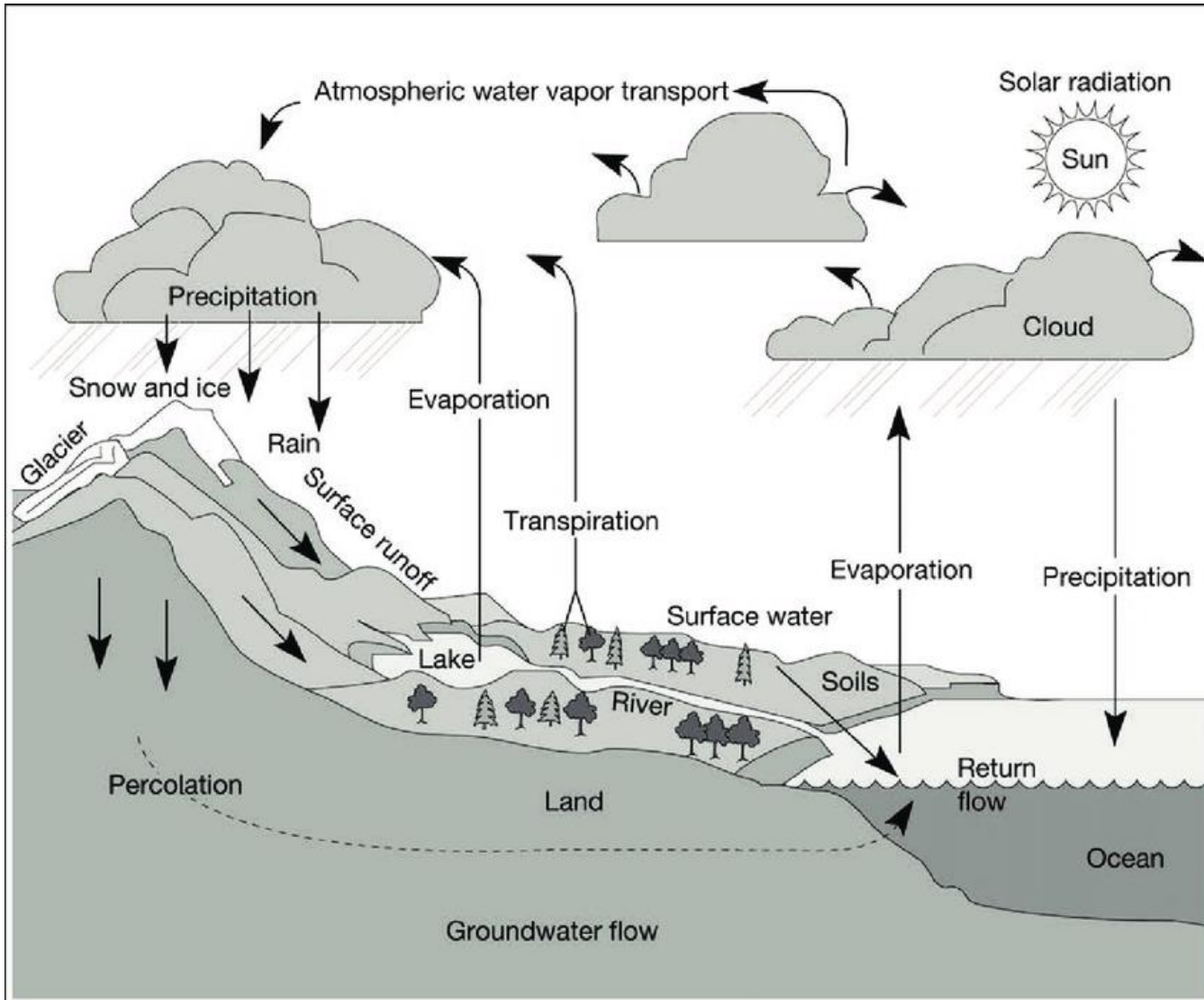
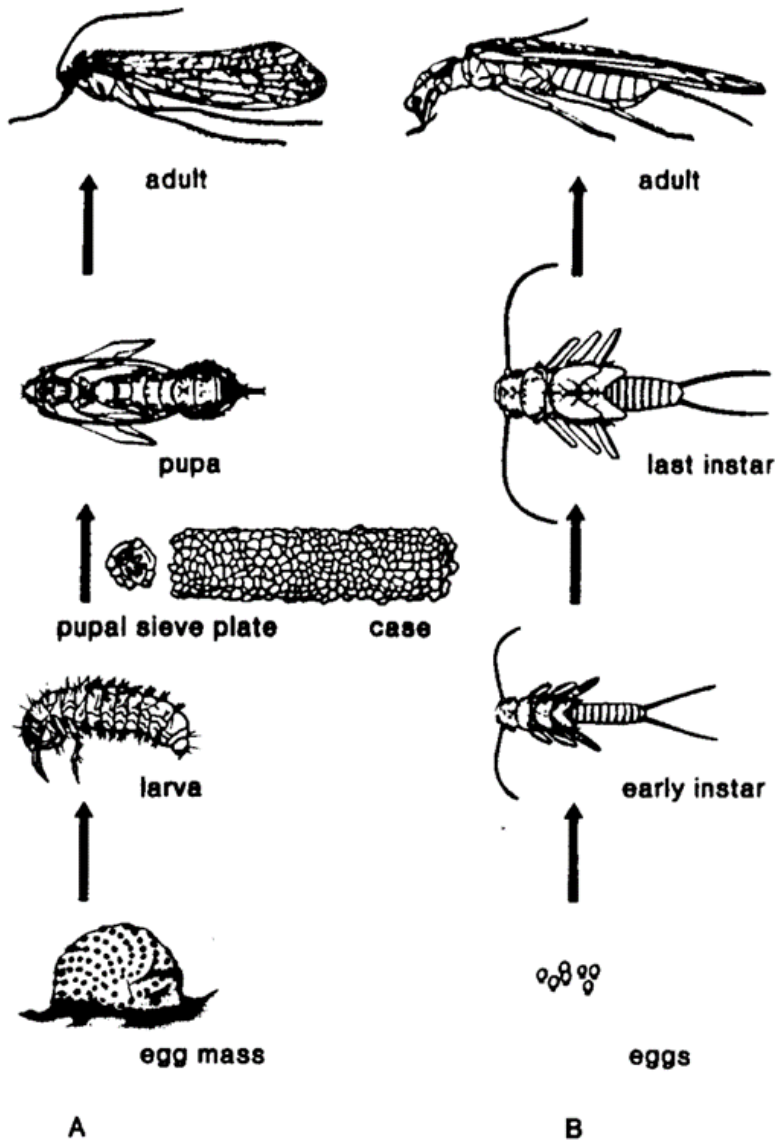


Hydrologic Cycle



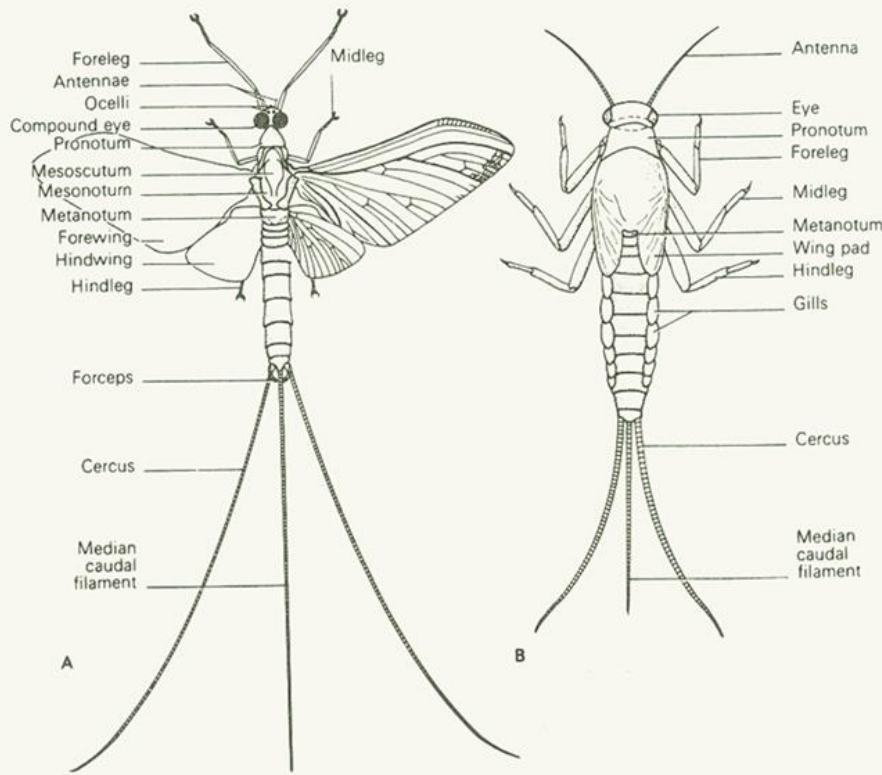
Clouds are composed of **condensed** water vapor. When the air cools, the water **precipitates** (falls) as rain or snow which either **runs off** the surface or **infiltrates** (percolates) into the ground to become **groundwater**. Plants take up water from the ground and pass it through their leaves in the process of **transpiration**. Water is stored in lakes, oceans and glaciers or **evaporates** into the air where it eventually **condenses** into clouds, starting the cycle again.

Life Cycles



Insects change form dramatically as they grow up. They start out as tiny **eggs**, laid either singly or in jelly-like masses. Then they transform into either a grub-like **larva** or wingless **nymph**. Larvae and nymphs then go through a rest stage either as a **pupa** or an **imago**. Finally, they will emerge as **adults**. Often it is during emergence that they are eaten by fish. Flyfishers make lures which mimic the emerging adults. Those that survive will mate and lay more eggs, and the cycle starts again.

Mayflies



Mayflies are one of the most abundant insects in Cooks Creek. There are many different types of mayflies, some like fast moving water, some prefer slow moving water. Having many mayflies means that the water is very clean. All mayfly nymphs are herbivores, meaning they eat only plants and algae. The adult mayfly only lives for a few hours or days, and doesn't eat at all! You can easily identify a mayfly larvae by its three tails (cerci).

Caddisflies

Caddisflies are very common in Cooks Creek. The caddisfly larva look a lot like caterpillars. Most species make a protective home out of stones, sticks or leaves to hide from predators, like fish. As they grow, they either add on to their case, or abandon it and make a new one. If you watch calm pools carefully, you will often be able to see cases made of sticks or leaves moving along the bottom. Species that live in rushing water will attach their cases firmly to rocks.

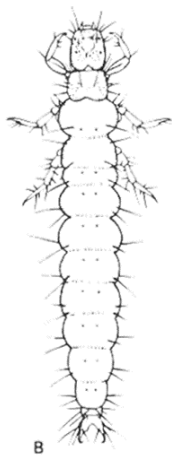


Figure 17.7



Figure 17.8



Figure 17.9



Figure 17.10



Figure 17.11



Figure 17.12



Figure 17.13



Figure 17.14



Figure 17.15



Figure 17.16



Figure 17.17



Figure 17.18



Figure 17.19



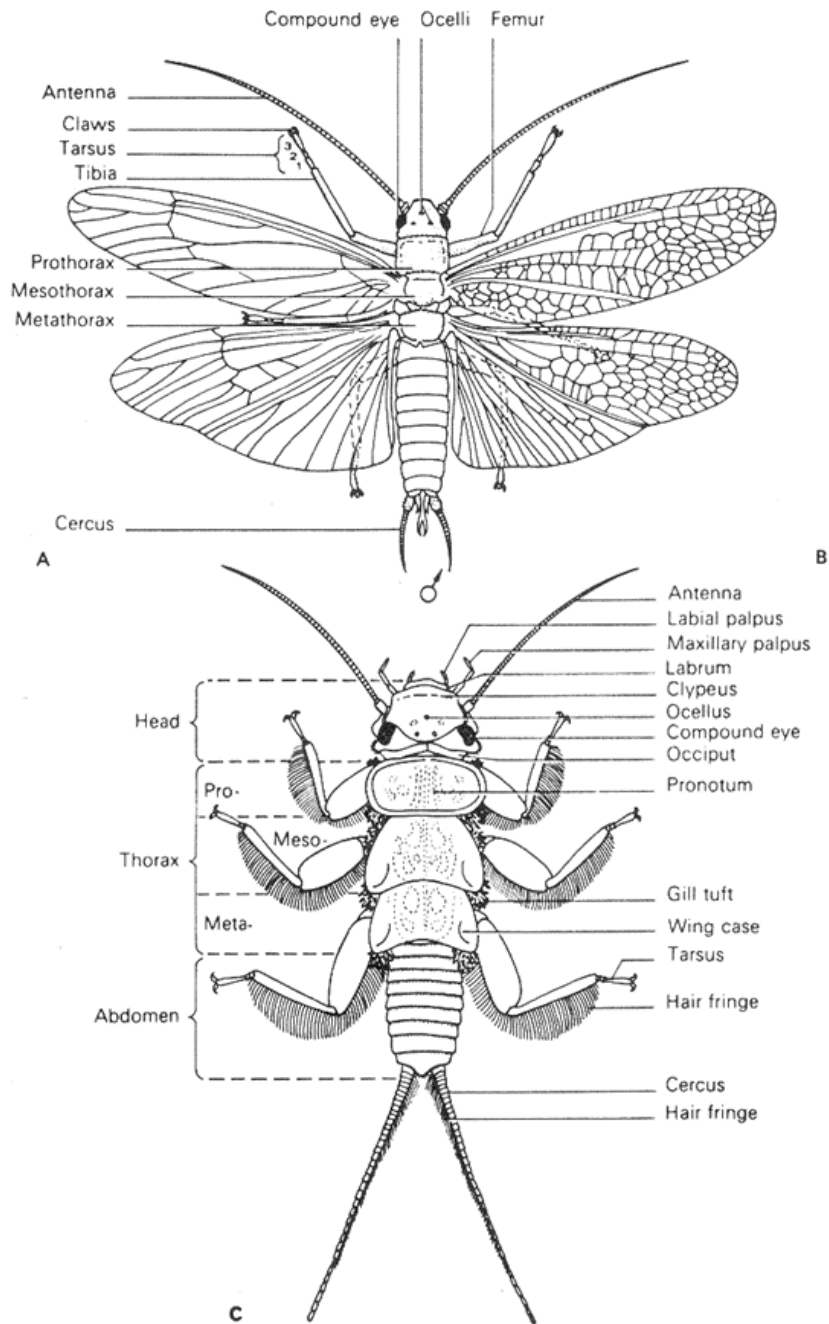
Figure 17.20



Figure 17.21

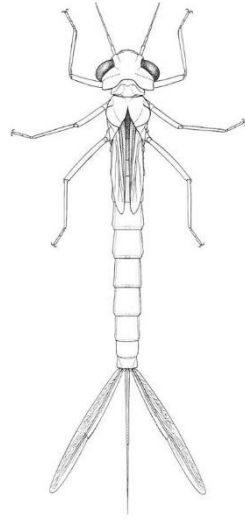
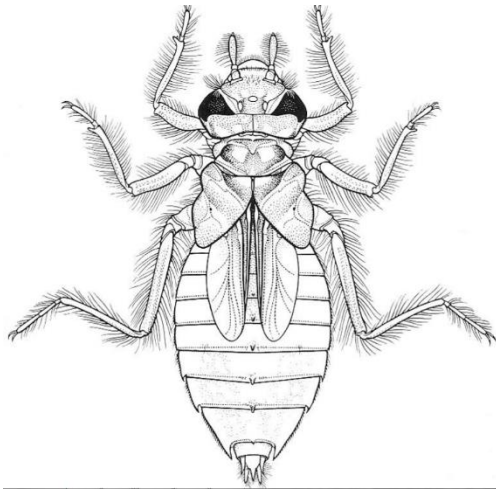


Figure 17.22



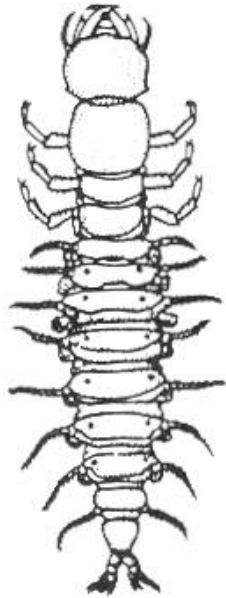
Stoneflies

Stoneflies are among the largest and most colorful of the insects of Cooks Creek. Stoneflies only live in very clean water. Most stonefly nymphs are predators; they eat other insect larvae. You can easily identify a stonefly nymph form other nymphs by its two tails (cerci).

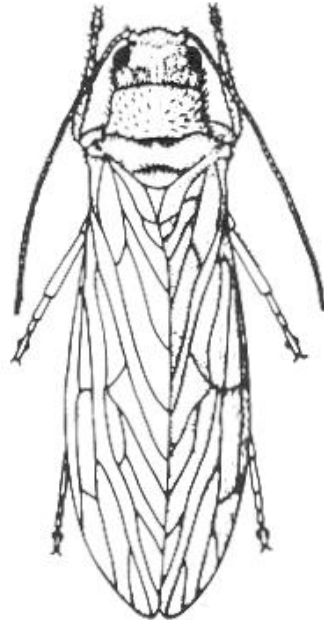


Damselfies and Dragonflies

Most of us know these insects in their colorful adult form, but they are important predators as nymphs as well. Some species live as nymphs for 2-3 years before becoming adults. Dragonfly nymphs have short stiff cerci and damselfly nymphs have long feathery cerci.



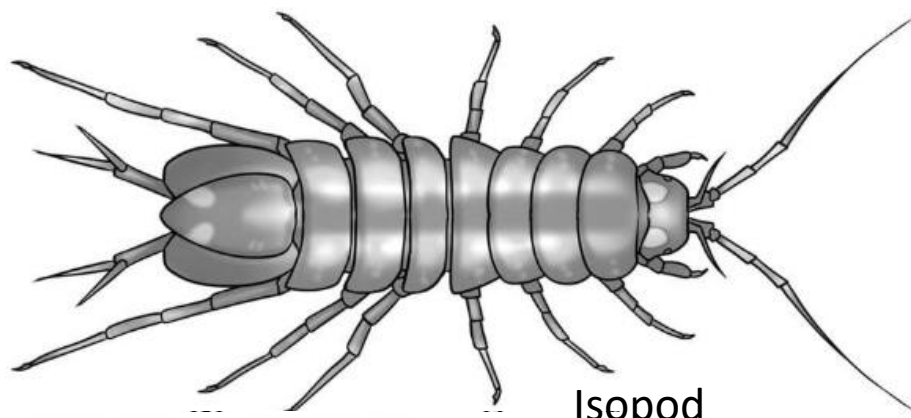
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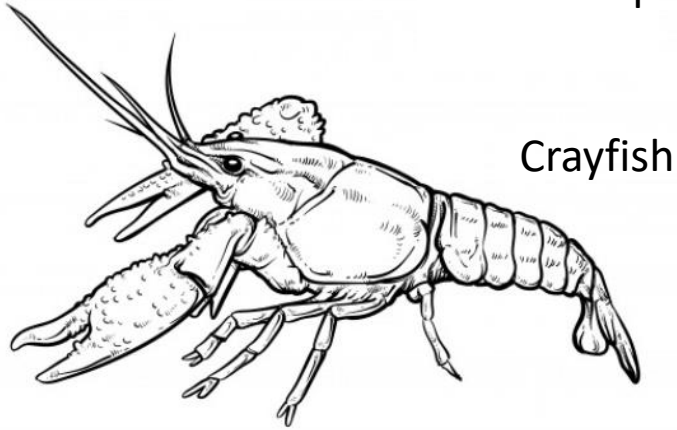
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Dobsonflies

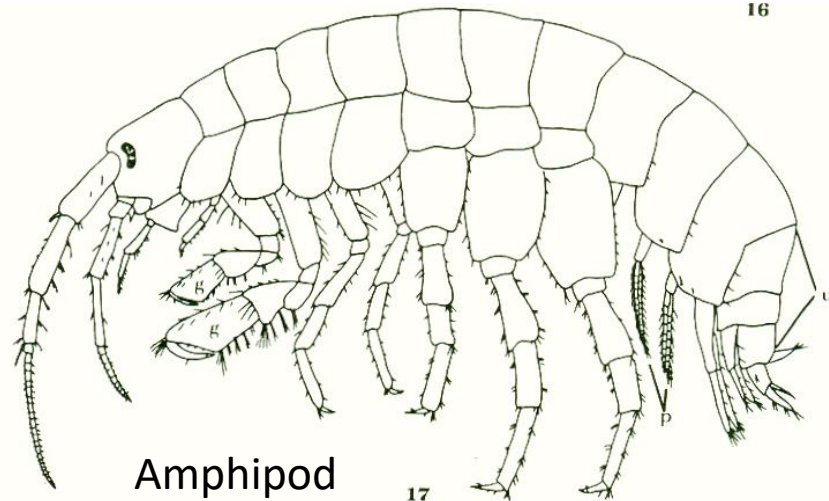
Commonly known as hellgrammites, these guys are the biggest and baddest of the mini-monsters and can grow to be up to 4 inches long. The adults aren't typically seen during the day, but they do come to lights at night. Watch out, they do bite!



Isopod



Crayfish



Amphipod

Crustaceans

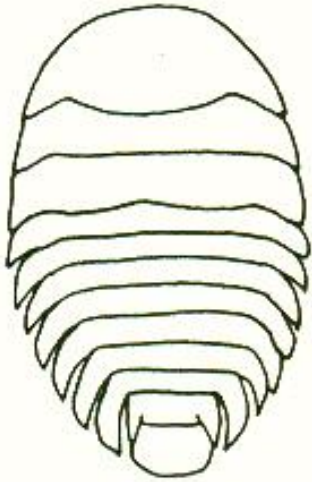
Crustaceans are a group of animals that contains shrimp and lobsters. While those creatures are only found in the ocean; crayfish, amphipods and isopods are very common in Cooks Creek. Crayfish are scavengers, they clean up dead animals. Amphipods and isopods are detritovores, meaning they collect and eat dead and dying plants. Amphipods are flattened side to side, isopods are flattened top to bottom. You can find all three crustaceans by looking under rocks in pools or at the edges of the stream.

16

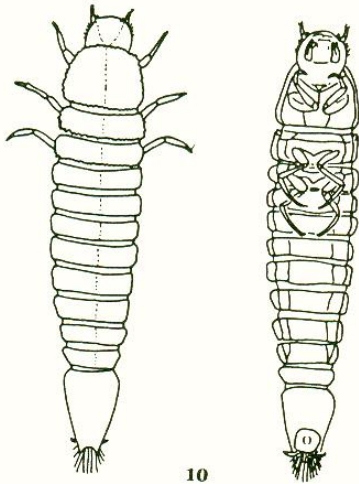
17

Beetles

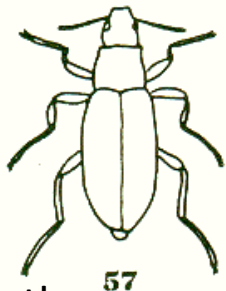
You may not know that there are beetles in the creek, but there are actually quite a few. Two of the more common are water pennies and riffle beetles. Water penny larvae are flat so that they can hug onto rocks in fast moving water. Both species require very clean water. Other species like whirligigs and diving beetles can be found in calmer spots. Aquatic beetles live their entire lives in the water, and only come out to find a mate.



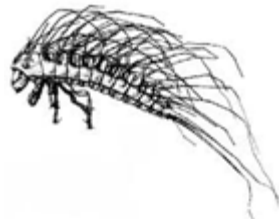
Water Penny



Riffle Beetle
Larvae

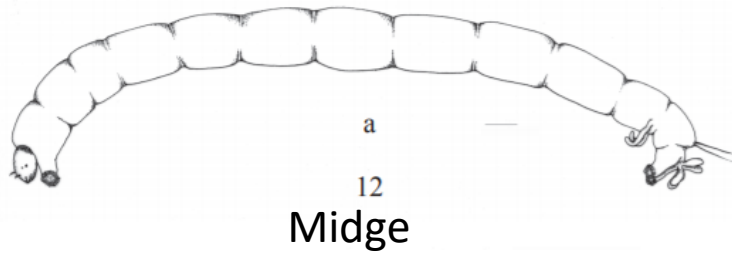


Riffle Beetle

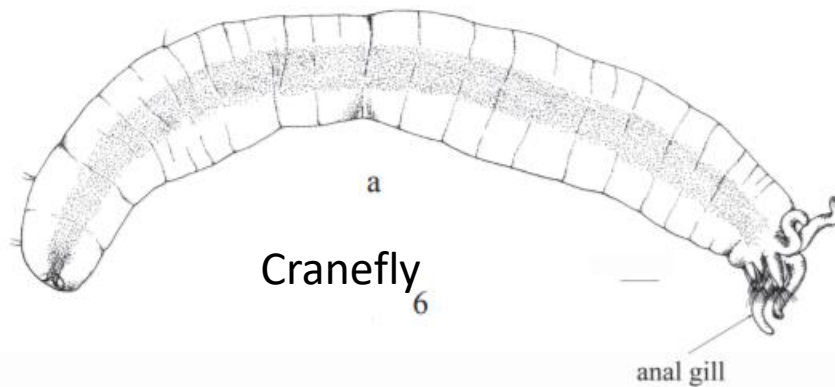
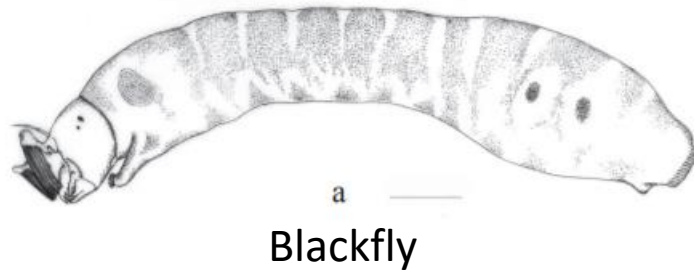


Diving Beetle

True Flies



Fly larvae are the most abundant life form in most freshwater streams, but they certainly aren't the most glamorous. In fact, many of them are VERY ugly. The largest and grossest of them all is the crane fly, which can be up to 3 inches long. Most flies are harmless as larvae or as adults, like the midge and crane fly, but some can be nasty as adults, like the black fly. Fly larvae are a very important part of the stream ecosystem, providing food for many animals, especially fish. Fly larvae can be very tolerant of poor water quality; sometimes fly larvae are the only insects found in polluted streams.



Finding the Right Spot

Pick a spot that is shallow, with lots of small rocks and cobble (riffle) and that has an adjacent open flat area to work. The water should be moving swiftly, but not be more than about 6 inches deep. As you hunt, work from the bottom of the riffle to the top to keep as much of the area undisturbed as possible before you sample.



Capture your Mini-monsters

Open the seine net, leaving a couple of turns of screen on the handles. Stand in the stream facing upstream. Place the net firmly on the bottom in good current, with the top leaning backward toward you. Have a friend scuffle their feet or hand scrub the rocks and gravel for a couple of feet upstream of the net for about a minute. When done, rinse the collected material into the center of the net and scrape it carefully into the plastic tray. Examine the net carefully for any stray creatures.



Find, sort and identify your Mini-monsters



Take a few minutes to just watch what is going on in the tray. You will probably see quite a few creatures! Using the pipettes or straws you can move the material around and even capture some animals. Put some water in the containers and place your captured monsters in them to more closely observe their form and behavior. Using the simplified key, see how many different organisms you have collected. You can use the ice cube tray to sort your zoo. When done, return all the material and insects to the stream.



Tolerant Taxa



Odonata (dragonflies and damselflies)



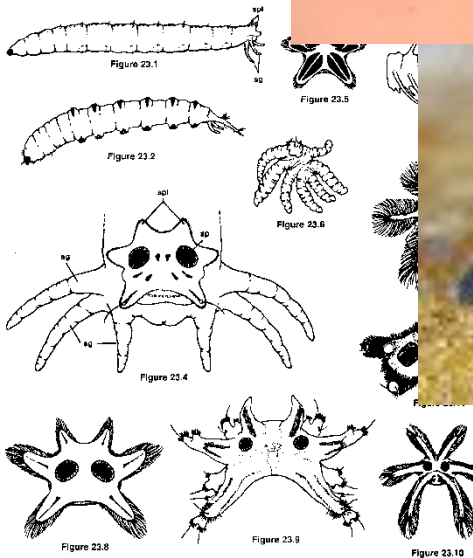
Mollusca (snails and clams)



Crustaceans (amphipods and crayfish)



Diptera (craneflies, midges, blackflies, horseflies, etc)

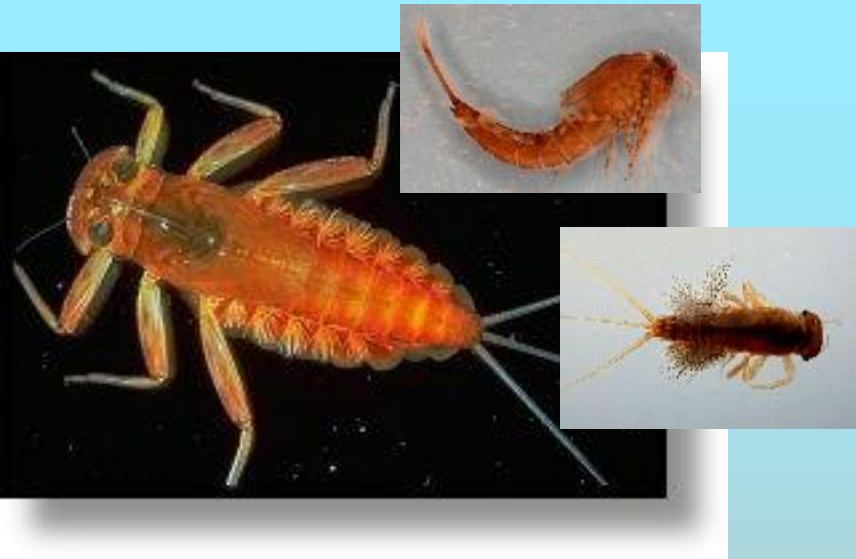


Annelids (worms and leeches)

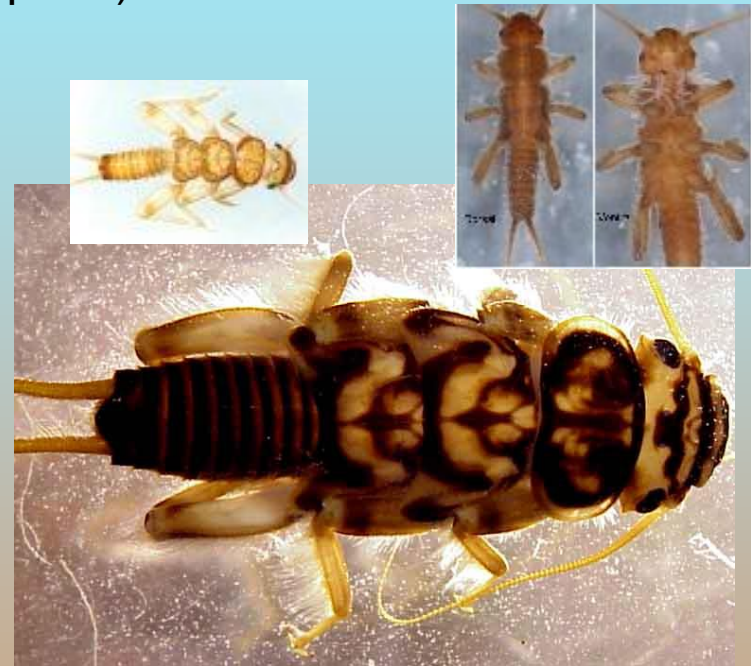


Sensitive Taxa

Mayflies
(Ephemeroptera)



Stoneflies
(Plecoptera)



Caddisflies
(Trichoptera)

