

# Aquatic Insects and Water Quality in the Watershed

The health of a stream depends on the quality of the water that flows through it. To care for the stream, we must also care for its watershed—all the land that drains to it.

Everything in the watershed affects the water in the stream. Hazardous chemicals, automotive products, pesticides, fertilizers, pet wastes, excessive soil erosion and air pollution all contribute to water pollution.

These pollutants don't have to be dumped directly into the water to cause a problem. They can be washed into the streets and storm drains by rainfall, snowmelt and over watering—eventually ending up in wetlands, streams and lakes.

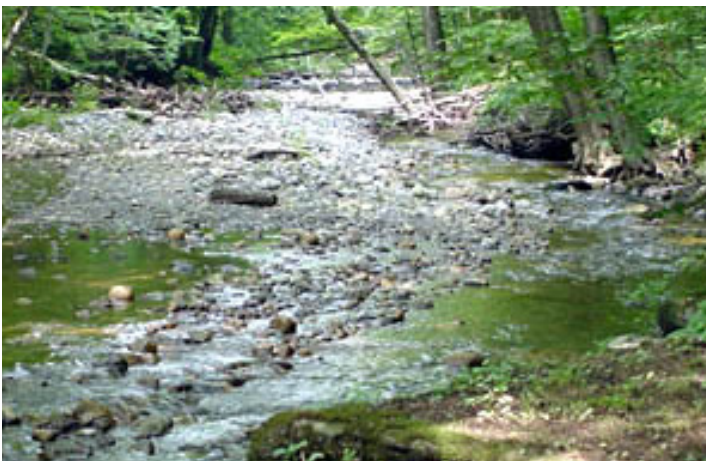
Resulting impacts of water pollution can range from the obvious, such as oil floating on the water to losses of wildlife due to habitat destruction.

## Aquatic insects may indicate water quality.

Microhabitats for aquatic insects are created by substrate and flow. They live in rocks and gravel (riffles) in rivers and among the sand, muck, dead leaves and twigs, plants and tree roots in streams and ponds.

Insects you will frequently find include:

- Stoneflies
- Damselflies
- Mayflies
- Midges
- Caddisflies
- Mosquitoes
- Dragonflies
- Black flies



*Riffles in rivers provide habitat for aquatic insects.*

## Some indicator species.

The following aquatic insects are used to study water quality because they are common in all streams, easily collected, relatively easy to identify and have life cycles that can last a year or more.

During their life cycles, they will be exposed to many extreme environmental conditions. The indicator species may be sensitive to thermal pollution (city pavement and water use), chemical pollution (fertilizer, car exhaust) and the effects of impoundment (reservoirs, detention ponds).



*Mayfly nymph*



*Stonefly nymph*



*Caddisfly nymph*

## Mayflies (Ephemeroptera)

- Larvae live in variety of flowing, standing water
- Gills on abdomen absorb oxygen

## Caddisflies (Tricoptera)

- Variety of flowing and standing water
- Get oxygen through gills and all over body surface
- Have some fringe on abdomen

## Stoneflies (Plecoptera)

- Larvae live only in flowing water with high dissolved oxygen and cool temperatures
- Some have gills on thorax, others absorb oxygen throughout body

## Aquatic insect characteristics.

Aquatic insect larvae have the following common characteristics:

Life cycle

Complete or  
Incomplete

2 antenna

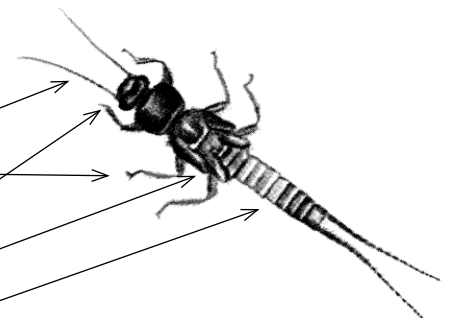
6 legs

3 body parts

Head

Thorax

Abdomen



## Common aquatic insects in Fort Collins.

The storm drain or gutter in the street outside your home carries water into a network of storm drains that lead directly to the Cache la Poudre River. Storm drains are separate from the sewer system—which handles wastewater from your sinks, tubs and toilets—and does not go to a treatment plant but into our streams, rivers and lakes.

If you look carefully in a stream, you will see many living things that depend on clean water to survive. Let's look at a few of the common aquatic insects you may find right here in Fort Collins.



*Collecting aquatic insects is easy - and fun.*

Go down to a stream or the Poudre River and turn over a rock. What will you find? You may discover a caddisfly larva in his case. Look for a sand, stone or vegetation shelter stuck together with silk from the caddisfly's labial glands.

You may spy a caddisfly larva with a bright green body that peeks out of the opening. Take a hand lens or magnifying glass and see if you can find the gills that cover its body and float like feathers in the current. Perhaps you will find a caddisfly's net that is spun from the fine silk that catches food as it is carried down the river or stream in the current.



*Caddisfly larva emerging*

Turn over a rock. Can you find a beautiful stonefly nymph? Sadly, stoneflies are very sensitive to pollution and we do not find them in our streams but you can find them in the Poudre River.



*Adult stonefly*

Look for an amber colored body with great jointed legs, two tails, two claws and patterns on the body that resemble grandma's amber necklace. Can you see the delicate hairs that cover parts of the stonefly's body?

Turn over a rock and look for a mayfly nymph. There are many fabulous species of mayfly in our local waters. They may have two or three tails on the abdomen. Look for the one with large developed legs, a flat body and eyes that are located on the top of its head. Some mayfly nymphs have bodies shaped like a torpedo. Take your hand lens and see if you can find gills that look like a feather duster or small leaves on its abdomen.



*Adult mayfly*

You may see some aquatic beetles in the water. The first pair of wings forms a shell-like covering over the abdomen. Some beetles have gills to get oxygen out of the water. Other beetles carry air bubbles with them at the tip of their abdomen. See if you can find a beetle swimming to the surface to replenish the air bubble.



*Water beetle*

Walk down to a nearby stream or the Poudre River and turn over a rock. What will you find? Submit a drawing of your favorite one. You may see it the next time you are walking past a storm drain in the city.