

# Welcome to the Northern River Ecosystem.

## Here's a closer look at its insects!

Insects are **invertebrates**, which means they don't have a backbone. Many invertebrates are soft, slinky, slimy things like slugs and leeches, worms, and jellyfish. But insects belong to the largest group of invertebrates, called **arthropods**. Arthropods have a hard exoskeleton for protection, and their bodies are divided into repeating segments.

**Aquatic insects** spend at least a part of their life in water. For some, this means spending their early life, or **larval stage**, eating and growing in the water until they undergo **metamorphosis** and develop wings as adults. Aquatic insects that spend only a part of their life in the water are doing an important job when they later get eaten by land animals or die and decompose on land. They are bringing nutrients from the water onto the land.

In the northern river ecosystem, **dragonflies** start their life cycle as larvae in the water and then transition to the land. They are often found in slower-moving parts of the river, near the shore. The larvae are **carnivorous** and eat tadpoles, small fish called minnows, flies, mosquitoes, and other small insects. A special mouthpart called a mask unfolds and shoots out so a larva can catch its prey and pull it back to its mouth. Dragonfly larvae have many **predators** including fish, frogs, larger larvae, and other aquatic insects.



As adults, dragonflies are strong fliers. They can fly forward, backward, and even quickly change directions. This allows them to be successful hunters, often catching prey like bees, flies, butterflies, and even other dragonflies in mid-air. Their **predators** include birds, spiders, and larger dragonflies. Frogs and fish can also prey on them when they are laying eggs in the water.

Another aquatic insect that spends part of its life in the waters of northern river ecosystems is the **mayfly**. In the early stages of their life, mayflies are mainly **herbivores** and **detritivores**, eating algae and decomposing pieces of plants and animals found in the water. They live in shallow waters and burrow into the soil and sand on the river bottom. Their **predators** include other aquatic insects, leeches, crayfish, fish, and amphibians like frogs.



An interesting thing about mayflies is that once they leave the water, they only live a couple of hours or days at most, and they don't eat anything at all! Their main job on land is to reproduce. Dragonflies, birds, bats, and fish are the common **predators** of adult mayflies.

There are also some aquatic insects that spend their entire lives in the water, from the larval stage through to the adult stage. An example in the northern river ecosystem is the **whirligig beetle**. These beetles and their larvae are **carnivores**. The larvae eat other aquatic insects and invertebrates, and the adults often feed on land insects that fall into the water. Because they sometimes eat dead insects, they are also considered scavengers.



Whirligig beetles have two sets of eyes. When they are on the water's surface, one set looks down into the water while the other looks above it! These eyes help them to locate and capture their prey while avoiding predators. They are good swimmers underwater, and they can also fly if they need to. Common **predators** are fish, birds, and crayfish.

No matter how long they spend in the water, aquatic insects play an important role in the northern river ecosystem. They filter water; they help break down dead material at the bottom of rivers like leaves, insects, and other animals; and they are a food source for fish, frogs, birds, and many others. If you looked at the water under a microscope!

The river ecosystem is full of insects! Which ones do you see in ecosystems near you?

Learn more about the northern river ecosystem in



### This is the Boat That Ben Built

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