

# What is This Guide

This guide connects larval and adult stages of macroinvertebrates. It is a tool that helps early elementary students (K-3 recommendation) associate the larval stages of aquatic insects in their free-flying adult form.

Each section includes key diagnostic characteristics to make sure the insect in question is correctly identified. Discover what the macroinvertebrates will turn into when they complete their life cycle!

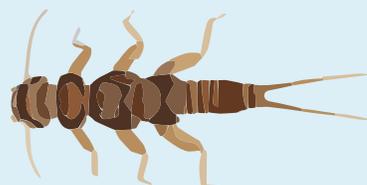
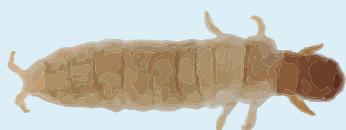
## How to Use it

This guide is intended to be used alongside a dichotomous key or biotic index.

Each section is grouped by insect order, and the second page of each section includes information about how that insect contributes to the larger ecosystem and is optional to print.

This guide was designed to be printed double sided. With pages back to back, they can be laminated to extend the life of the guide.

Hole-punch the top corners and clip pages together with binder rings.



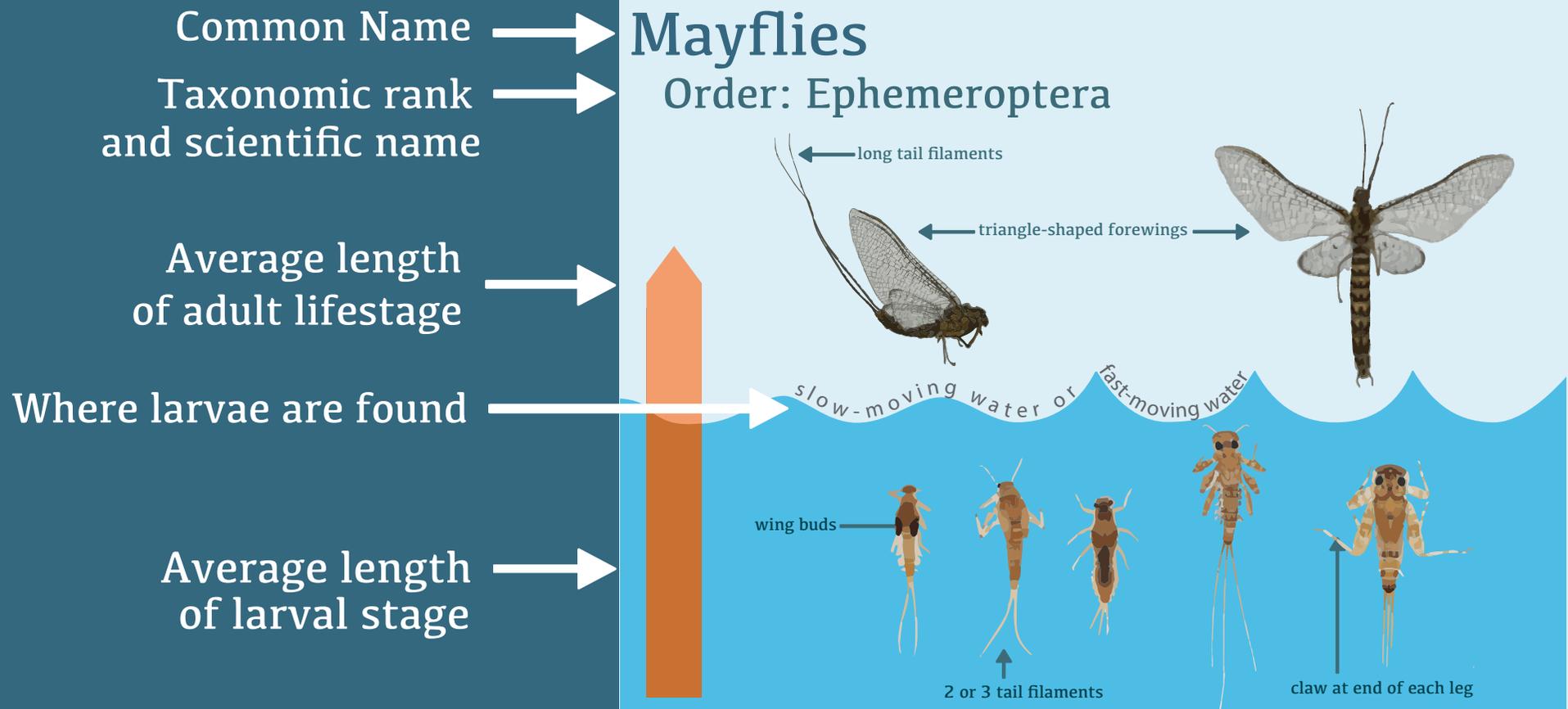


# Macroinvertebrates from Larvae to Adults



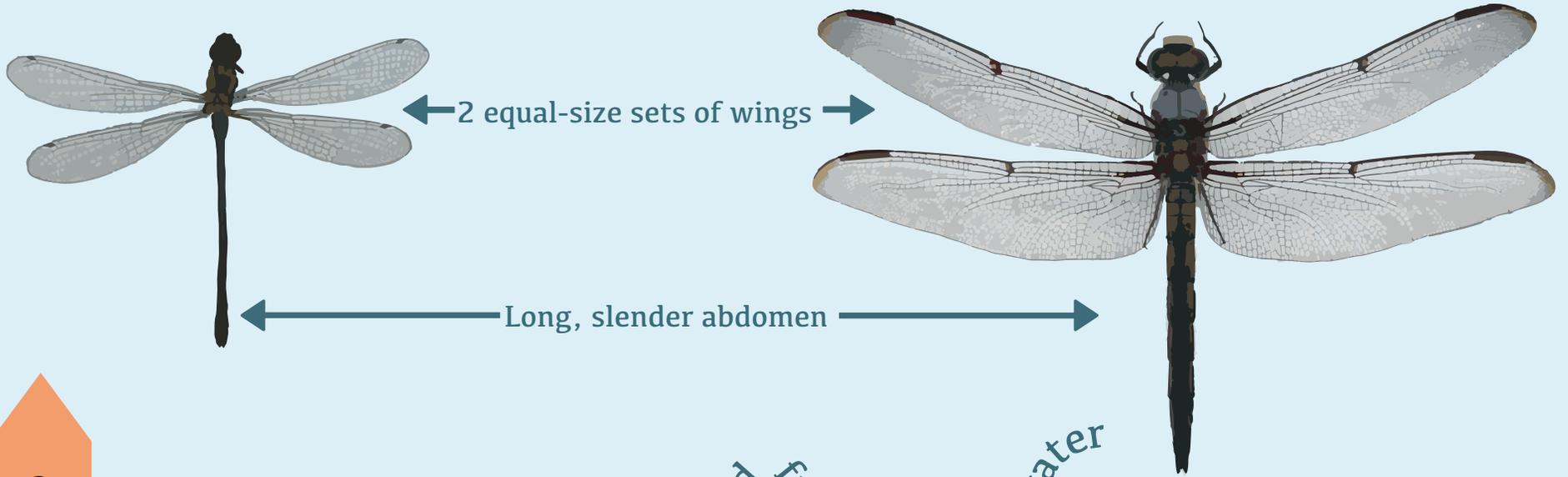
# Explanation of Section Contents

Each section has a consistent format that includes of the name of the insect, the length of time it spends in its aquatic vs terrestrial lifestages, habitat preference of larvae, pictures of larvae and adults, and important identifying characteristics of the insect. See the example below.



# Dragonflies and Damselflies

Order: Odonata

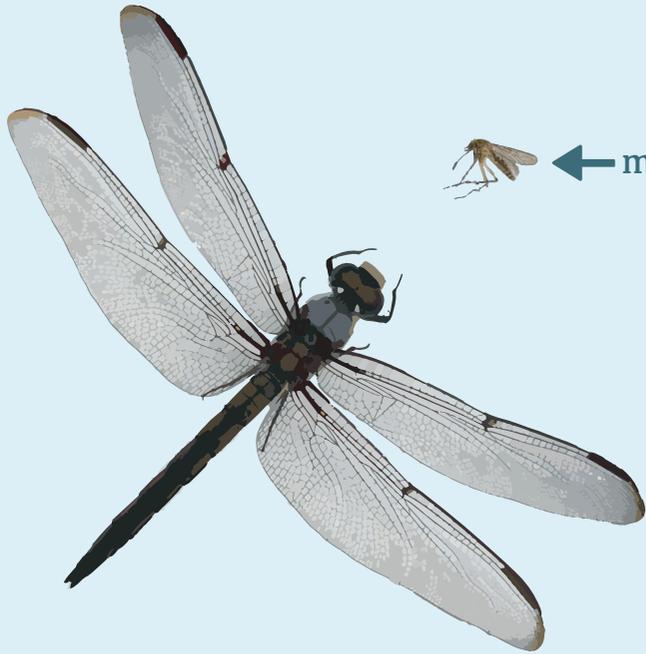


2 months  
2 to 3 years

slow-moving water and fast-moving water



# Odonata



← mosquito

Larvae and adults eat other insects— including mosquitoes— keeping their populations in check.

mosquito larvae

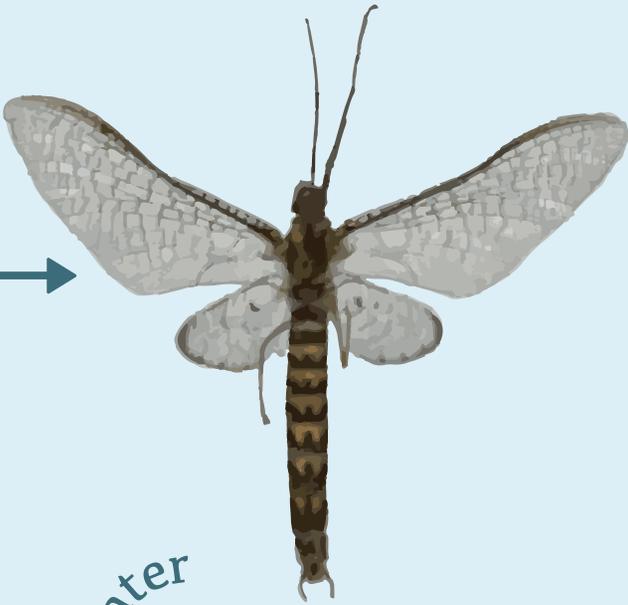


# Mayflies

## Order: Ephemeroptera

← long tail filaments

← triangle-shaped forewings →

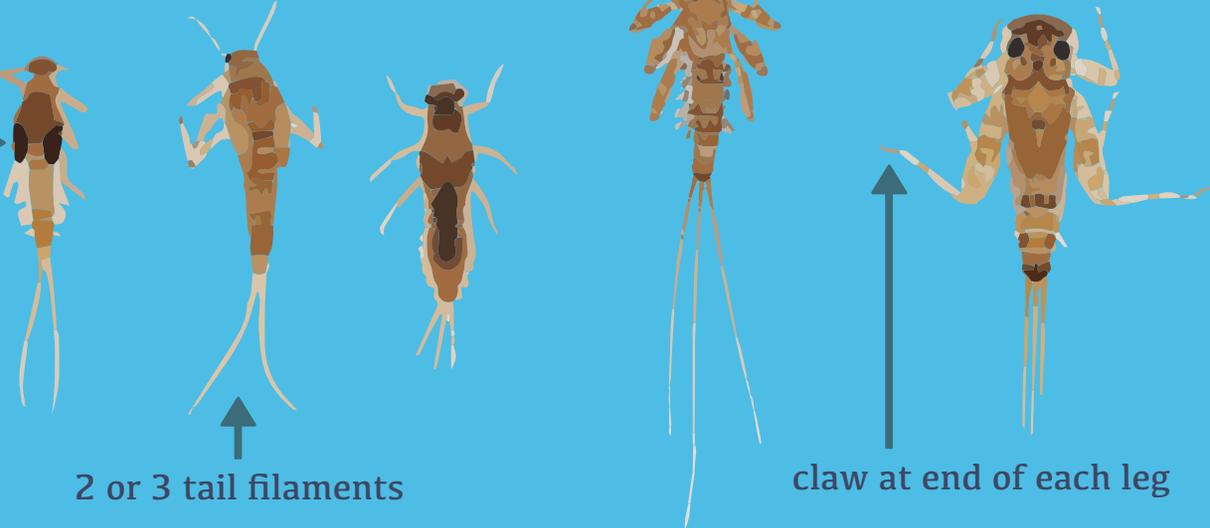


1 day to 2 weeks

1 to 3 years

slow-moving water and fast-moving water

wing buds →



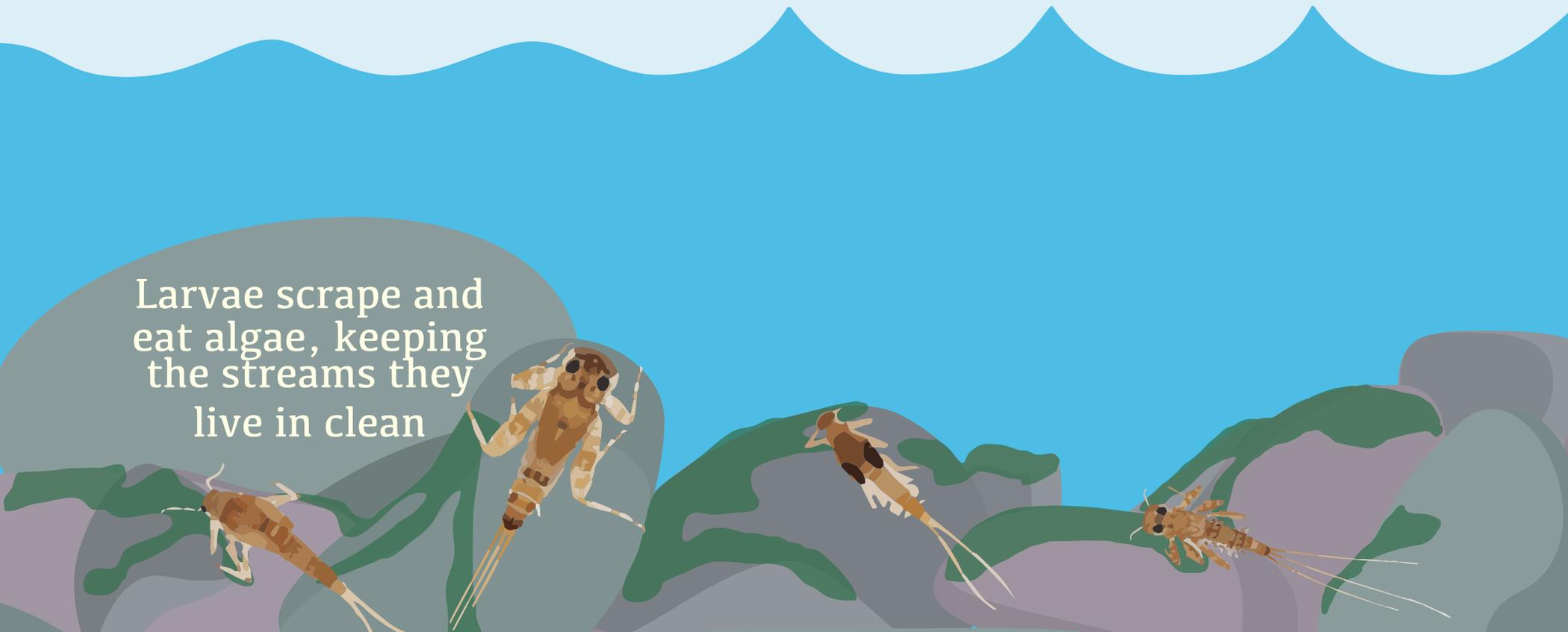
2 or 3 tail filaments

claw at end of each leg

# Ephemeroptera

Adults do not have mouths; they eat enough food for their entire life as larvae

Larvae scrape and eat algae, keeping the streams they live in clean



# Stoneflies

## Order: Plecoptera



← mosaic-like wings →



↑  
2 tail filaments

1 to 3 weeks

2 to 3 years

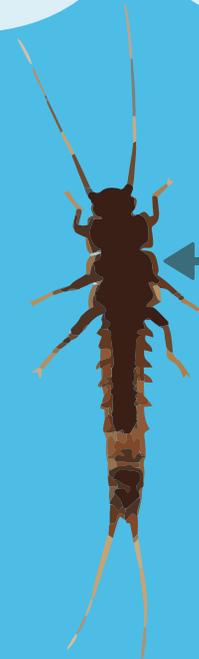
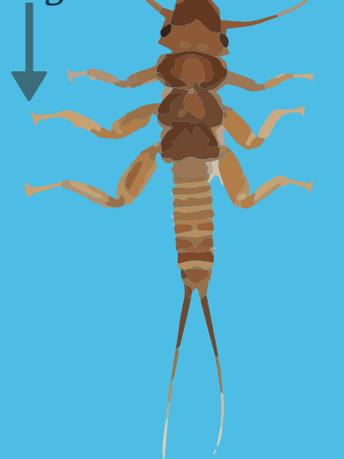
fast-moving water



↑  
2 tail filaments

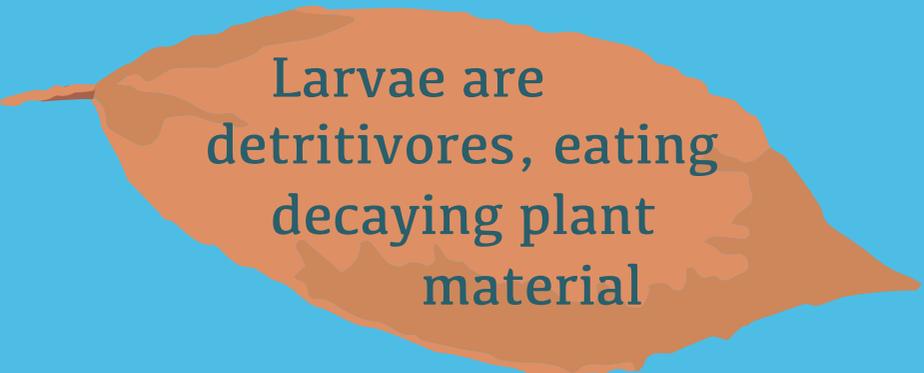


2 claws on each leg



← wing buds

# Plecoptera



Larvae are detritivores, eating decaying plant material

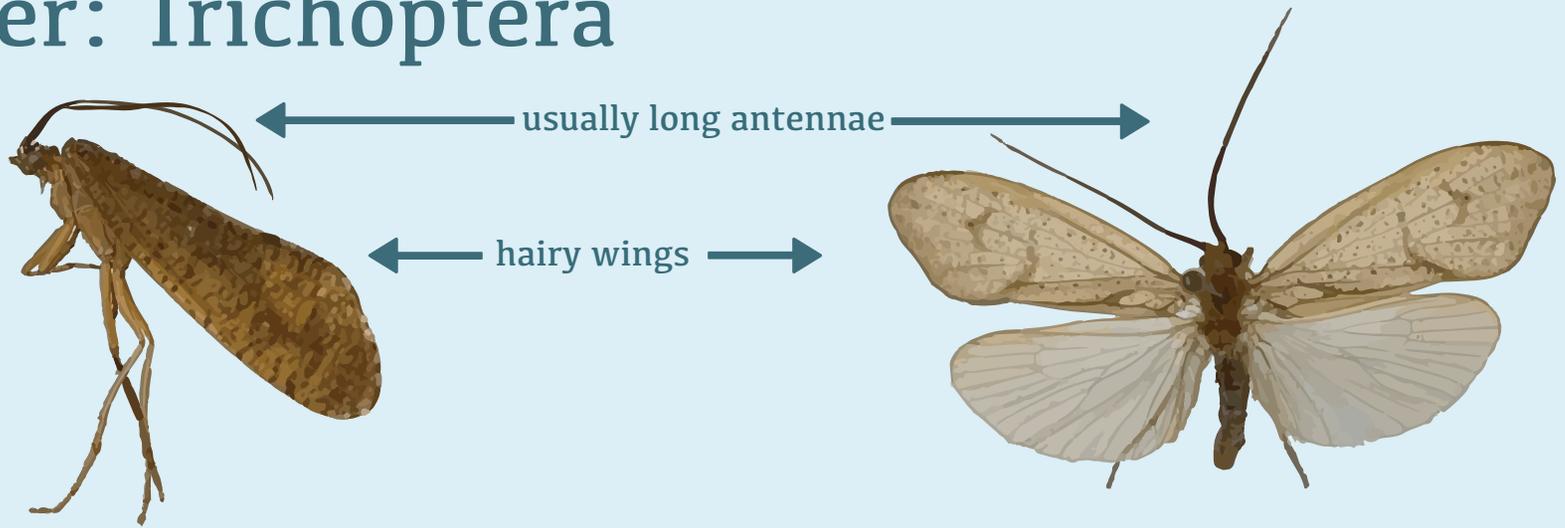


They help keep leaf litter from building up in streams



# Caddisflies

## Order: Trichoptera



2 months  
2 years

This block is a vertical orange bar with a pointed top. It contains the text '2 months' in a lighter orange section at the top and '2 years' in a darker orange section below it.

slow-moving water and fast-moving water

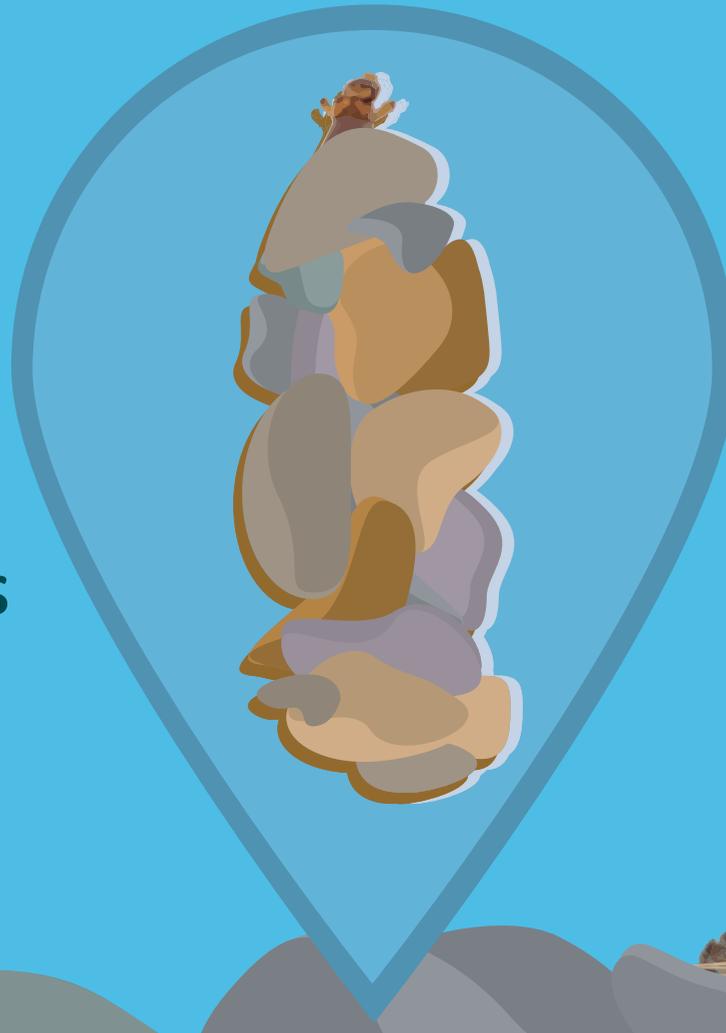
This block features a wavy blue line representing a water surface. The text 'slow-moving water and fast-moving water' is written in a white, sans-serif font, following the curve of the water surface.



# Trichoptera

Some larvae live in self-made cases while others are free-living under self-made nets

Silk produced from glands in the mouth holds their homes together and controls sediments on stream beds

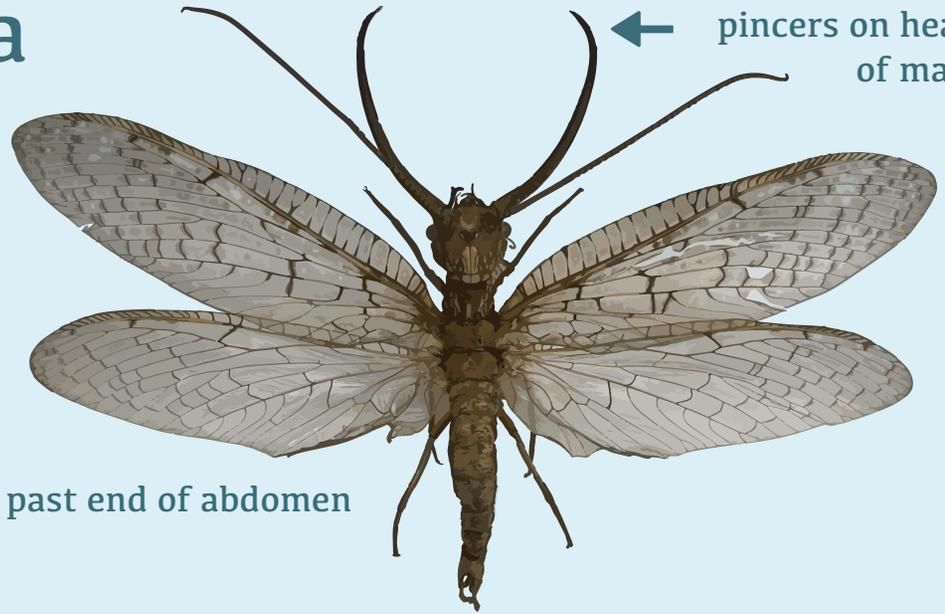


# Dobsonflies, Alderflies, & Fishflies

## Order: Megaloptera



← wings extend past end of abdomen



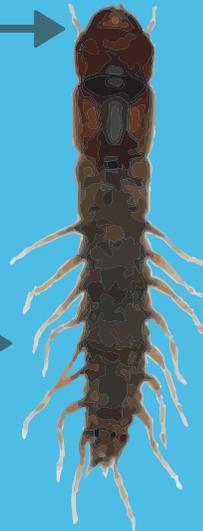
← pincers on head of male

1 to 2 months

1 to 5 years

fast-moving water

large mouth parts →



6-8 filaments on sides of abdomen →



← 2 tail filaments

# Megaloptera



Larvae  
and adults are all  
predators, though  
the large pincers on the  
adult males are  
harmless

Adults are  
nocturnal



# Credits

Photo credit for larval insects: [Macroinvertebrates.org](https://macroinvertebrates.org) | The Atlas of Common Freshwater Macroinvertebrates of Eastern North America, material of which is based upon work supported by the National Science Foundation under Grant #1623969.

Photo credit for adult insects: Celia Graef | specimens made available by work supported by the National Science Foundation under Grant # 2039242.

This field guide was developed and created by Celia Graef with support from the Frost Entomological Museum.

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