

Ohio Scenic Rivers Activity Book



H2O₂Ohio

Welcome to the world of aquatic bugs!

This activity book features some of the macroinvertebrates that are found in Ohio's streams. **Macroinvertebrates**. That's a big word. Let's break it down:

- "Macro" refers to objects that are large enough to see without a microscope, and
- "invertebrate" is an organism without a backbone.

Macroinvertebrates, sometimes called "bugs," include insects, crustaceans, worms, and snails to name a few. Some of these tiny bugs need very clean water to survive, while others can live just about everywhere, even in polluted water. Finding macroinvertebrates that need clean water is a sign that a river is healthy. Volunteers help the Ohio Scenic Rivers Program look for macroinvertebrates to make sure our state scenic rivers are healthy.

Keep reading to learn more about what different bugs need, what they eat, and what eats them! Look for these vocabulary words in **bold** used throughout this activity book.

Aquatic - growing or living in the water

Carnivore - an animal that eats only meat

Food web - a series of living things that shows how each organism is connected to the next organism.

Also known as a food cycle

Lifecycle - the series of changes a living thing goes through during its life

Herbivore - an animal that eats only living plants

Larva - the young stage of a bug that will undergo a complete metamorphosis

Metamorphosis - the change from one form to another

- **Incomplete Metamorphosis** - the change from egg to nymph, then nymph to adult

- **Complete Metamorphosis** - the change from egg to larva, larva to pupa, and from pupa to adult

Nymph - the young stage of a bug that will go through an incomplete metamorphosis

Omnivore - an animal that eats both living and dead plants and animals

Pollution - introduction of harmful materials into the environment

Predator - an animal that hunts and eats other animals

Prey - an animal that is hunted by another animal for food

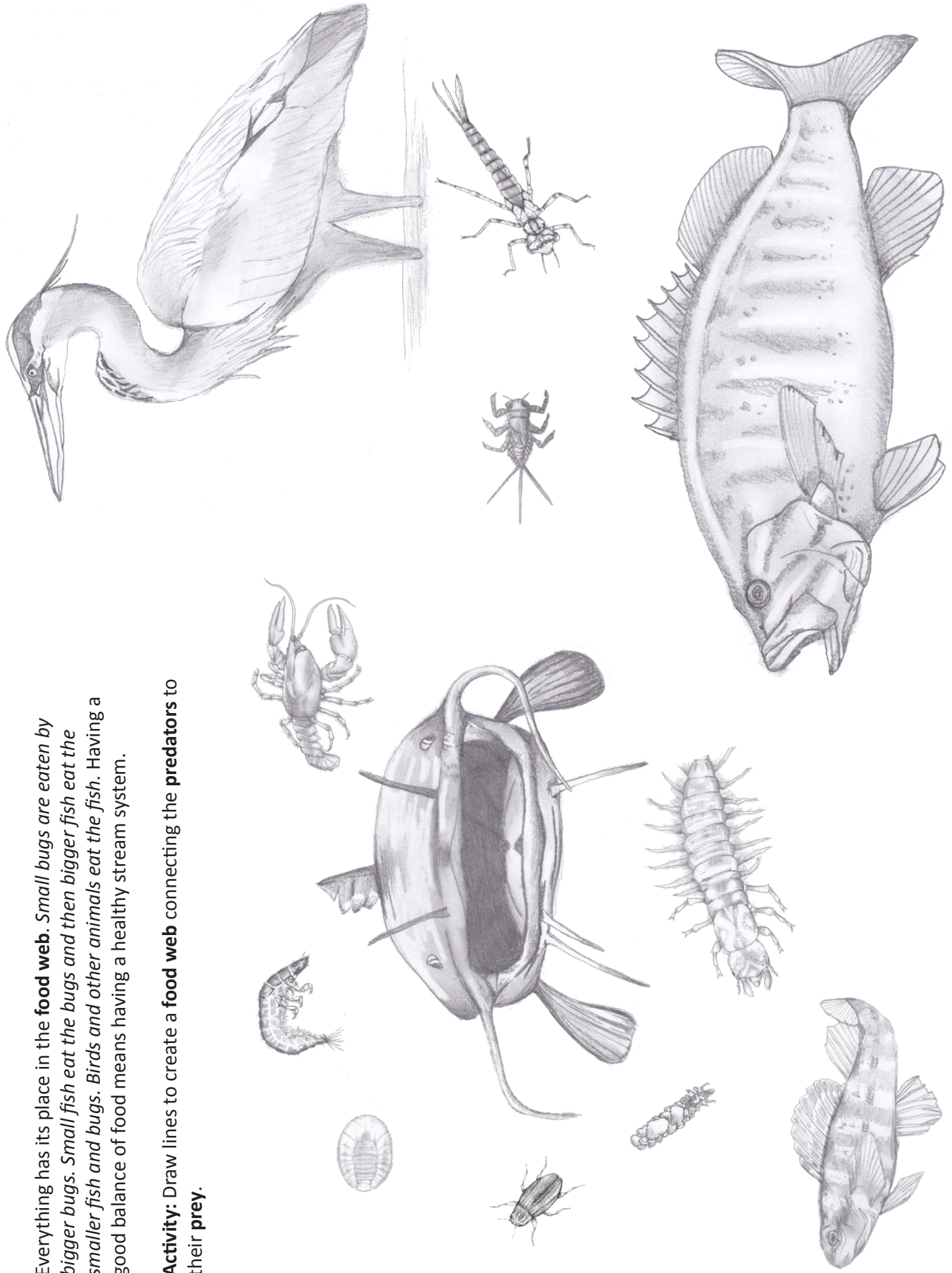
Pupa - the stage of a bug's lifecycle between larva and becoming an adult

Sensitive - easily reacts to little changes



Everything has its place in the **food web**. *Small bugs are eaten by bigger bugs. Small fish eat the bugs and then bigger fish eat the smaller fish and bugs. Birds and other animals eat the fish.* Having a good balance of food means having a healthy stream system.

Activity: Draw lines to create a **food web** connecting the **predators** to their **prey**.

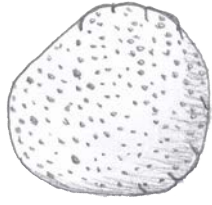


Caddisfly Larva

Activity: Draw arrows to show the caddisfly **lifecycle**.

HINT: Use the paragraph above to help complete the activity.

Caddisfly **larva** create tube-shaped homes out of materials like stones, sticks, and leaves. They are **herbivores** and eat **aquatic** plants and algae in the water. The caddisfly **lifecycle** begins with an egg, followed by **larva**, **pupa**, and then **adult**. This type of **lifecycle** is an example of **complete metamorphosis**. Caddisflies are **sensitive to pollution** and are indicators of good water quality.



Fun Fact: By building their own shelter, caddisflies keep themselves safe from **predators** like fish or other insects. Caddisflies have been used by artists to make jewelry by allowing them to build their homes out of gold and different gems.

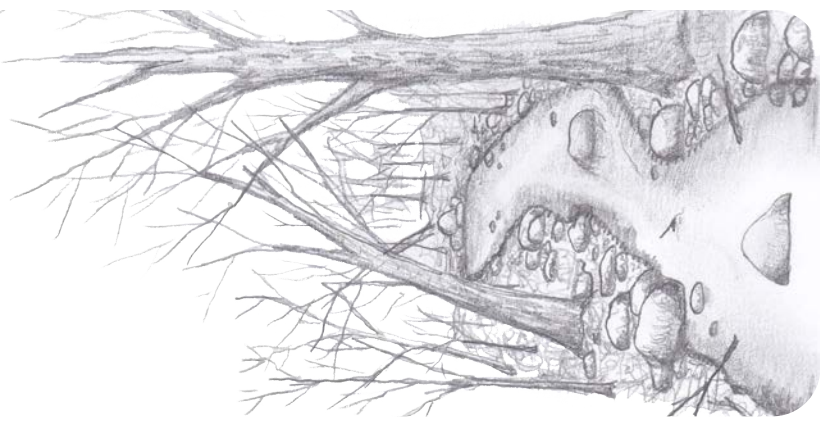
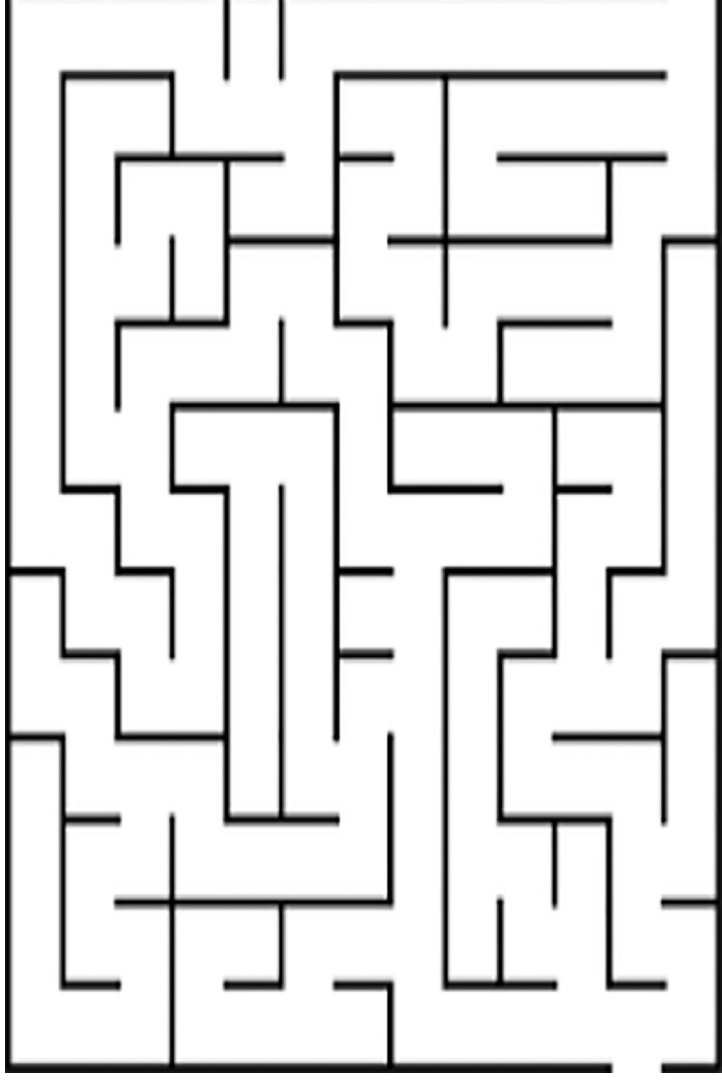
Caddisfly Larva



Crayfish

Crayfish are commonly found in Ohio's freshwater lakes, rivers, and streams. They can be found by looking under rocks and logs on the river bottom. Crayfish have large claws, which can be used for holding their food and defending themselves. Crayfish are **omnivores** — they eat both plants and other animals. Crayfish are somewhat **sensitive to pollution** in the water.

Activity: Help the crayfish find its way back to the creek.



Fun Fact: Crayfish often fight each other for territory. If they lose a pincher in a fight, or if they lose one to a fish, they can grow it back. That's why you can sometimes find crayfish with two different sized pinchers.



Crayfish

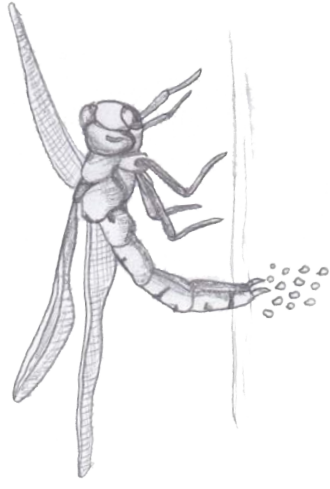
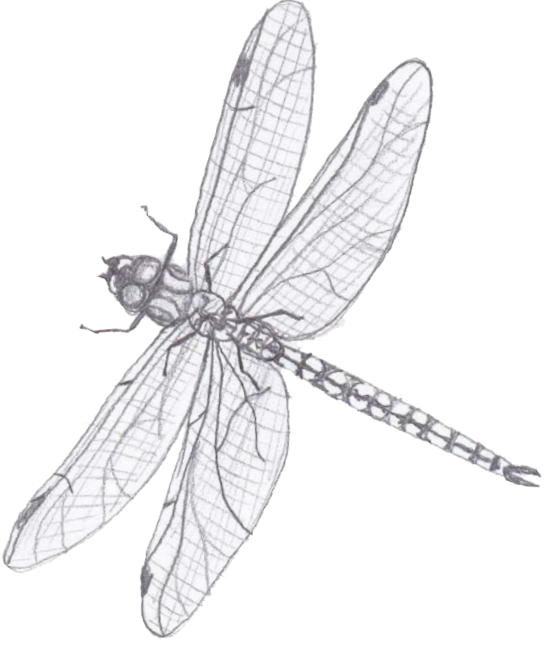
Dragonfly Nymph

Dragonflies hatch from eggs in the water and begin as a **nymph**. They can be found in **aquatic** vegetation along the edges of ponds and rivers. The dragonfly is a **predator** and will eat anything it can catch as both an adult and nymph. Dragonflies go through an **incomplete metamorphosis**. There are many kinds of dragonflies in many different sizes and colors. They are somewhat **sensitive to pollution**.

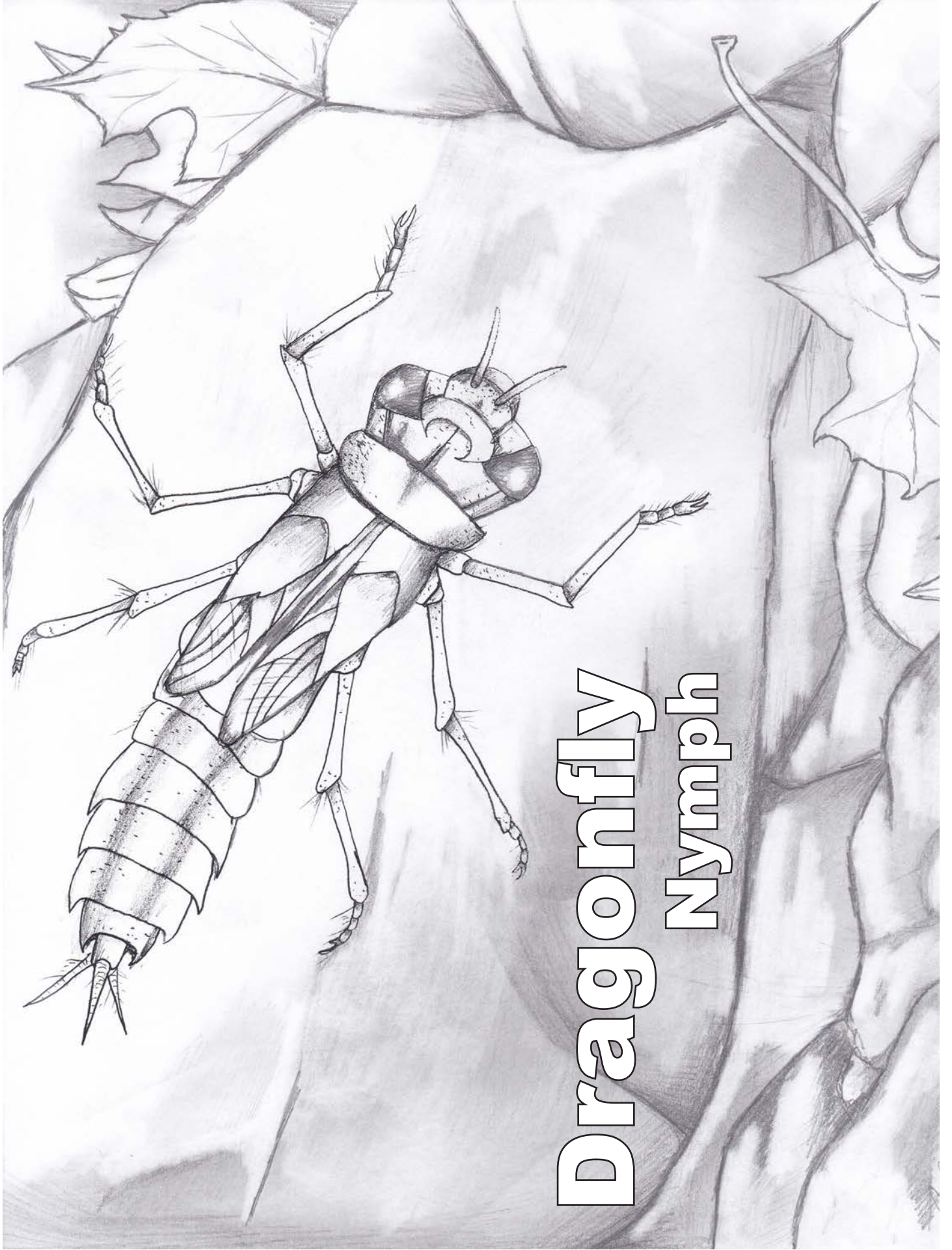
Activity: Word Search

V	E	G	E	T	A	T	I	O	N	P
D	X	A	Y	W	N	E	P	G	I	R
R	T	Q	G	A	F	B	O	J	P	E
A	Q	U	A	T	I	C	L	M	Q	D
G	P	A	E	E	A	O	L	R	O	A
O	B	T	T	R	L	L	U	W	K	T
N	M	I	P	A	G	O	T	X	G	O
F	O	C	O	S	H	R	I	V	E	R
L	A	P	N	S	K	S	O	U	M	L
Y	L	E	D	T	A	L	N	R	S	T

- Aquatic
- Colors
- Dragonfly
- Pond
- Predator
- Pollution
- River
- Vegetation
- Water



Fun Fact: Most of the dragonfly's head is taken up by its eyes. Their enormous eyes help make them excellent hunters.



Dragonfly Nymph

Damselfly Nymph

Damselflies are closely related to dragonflies but are smaller in size. Damselflies are **predators** and have large eyes, which allow them to see and catch smaller bugs. The damselfly **nymph** has three paddle-like tails which are actually its gills. They can be found under rocks in streams and ponds, and in **aquatic** vegetation. Damselflies go through **incomplete metamorphosis**. Damselflies are somewhat **sensitive** to **pollution**.

Activity: Crossword Puzzle

Across

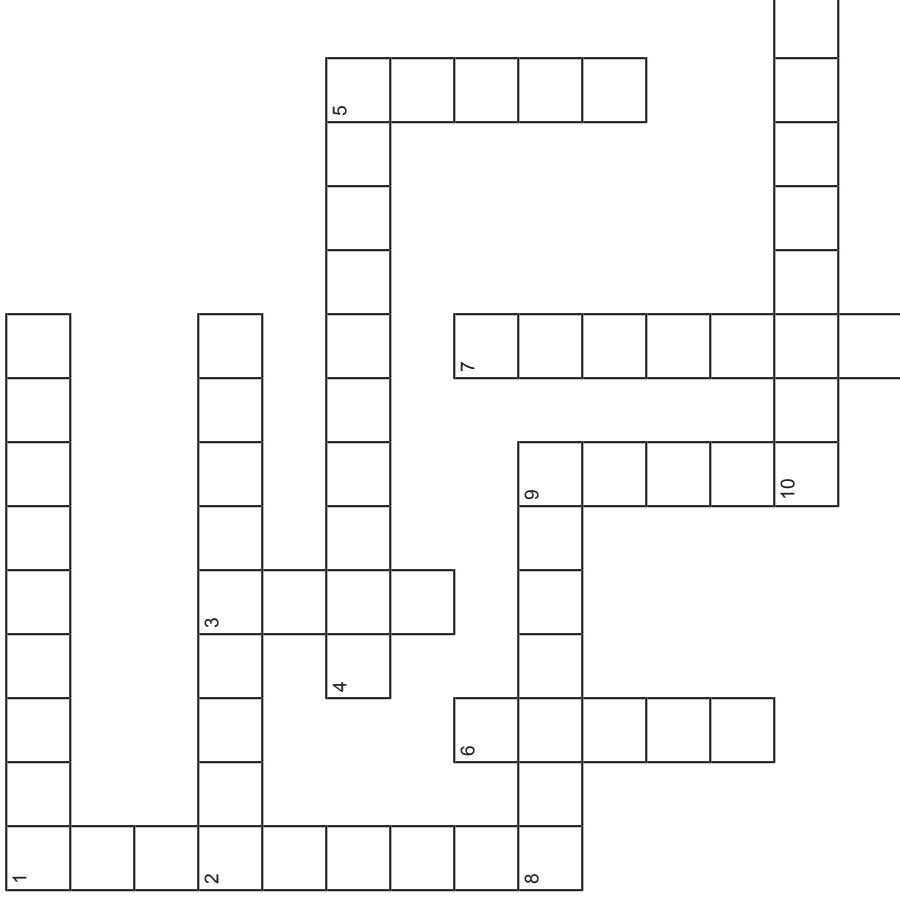
1. Damselflies are somewhat sensitive to _____.
2. The _____ nymph is pictured on the next page.
4. Damselflies can be found in aquatic _____.
8. Damselflies are _____ in size compared to dragonflies.
10. Damselflies are _____ sensitive to pollution.

Down

1. Damselflies are _____ and eat smaller bugs.
3. Damselflies have large _____ to see bugs.
5. The Damselfly _____ has paddle-like tails.
6. The Damselfly has three _____.
7. The Damselfly can be found in _____.
9. They can be found under _____.

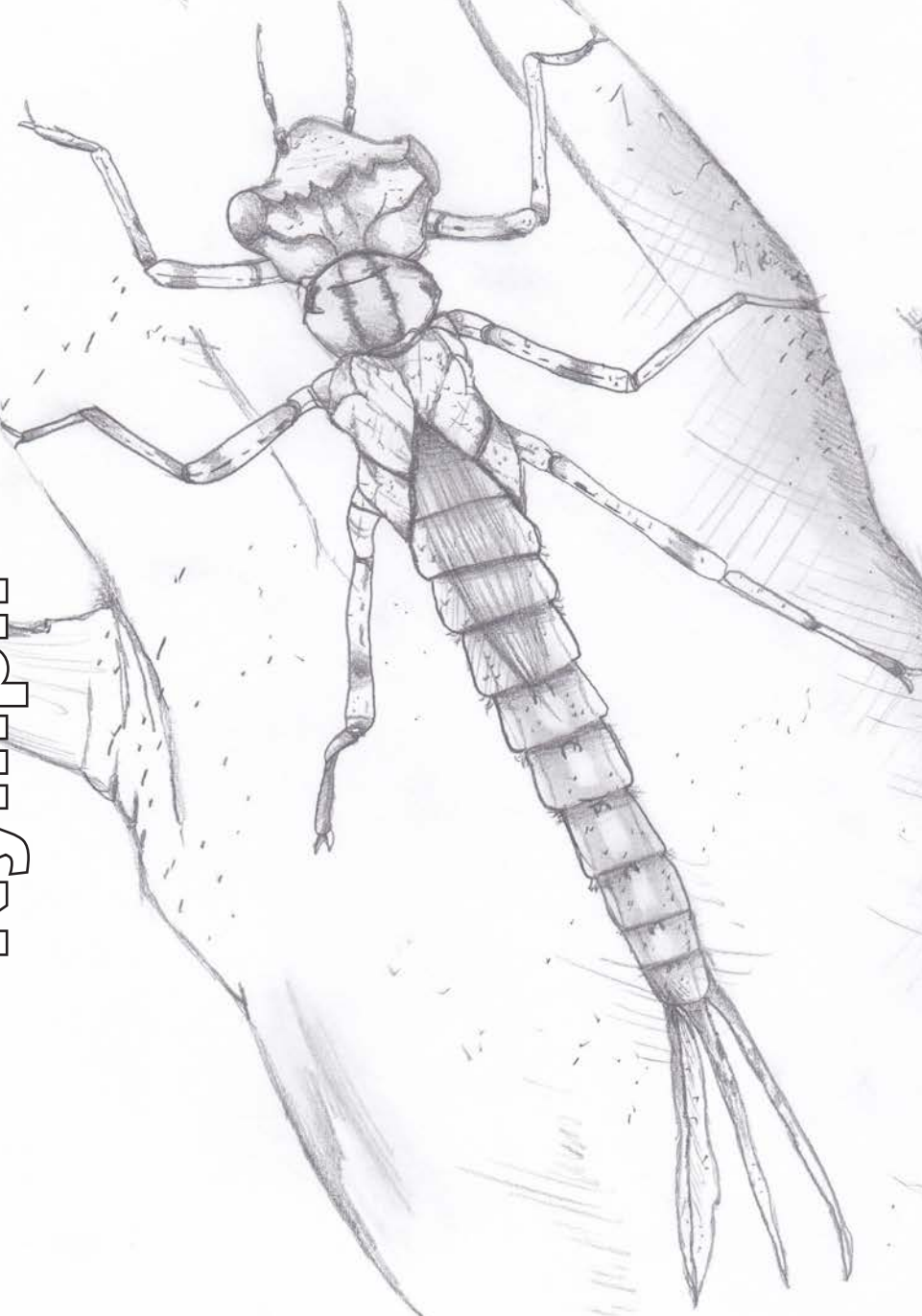
Hint: Use the

above paragraph to help find the answers to the crossword puzzle.



Fun Fact: Adult damselflies land with their wings closed while adult dragonflies land with their wings open.

Damselfly Nymph



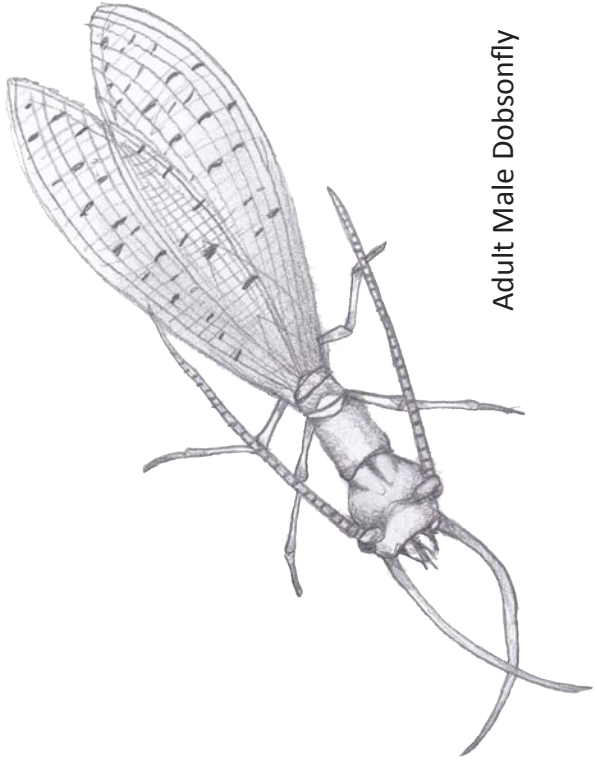
Dobsonfly Larva

The dobsonfly larva is also known as a hellgrammite. It is a fierce **predator** that will eat anything it catches with its pincers. They can grow up to 4 inches long and are found under large rocks in rivers and creeks. Hellgrammites are **carnivores**, which means they eat other animals. Because they are very **sensitive** to **pollution**, hellgrammites are a sign of clean water.

Activity: Word Scramble

Word Scramble	
TEA THGANIYN	KCERES
-----	-----
NCELA TEWRA	IECFRE
-----	-----
ODSNFYBOL	CNIPESR
-----	-----
-----	ALVRA
-----	-----

Hint: Use the paragraph above to help unscramble the words in the Word Scramble.

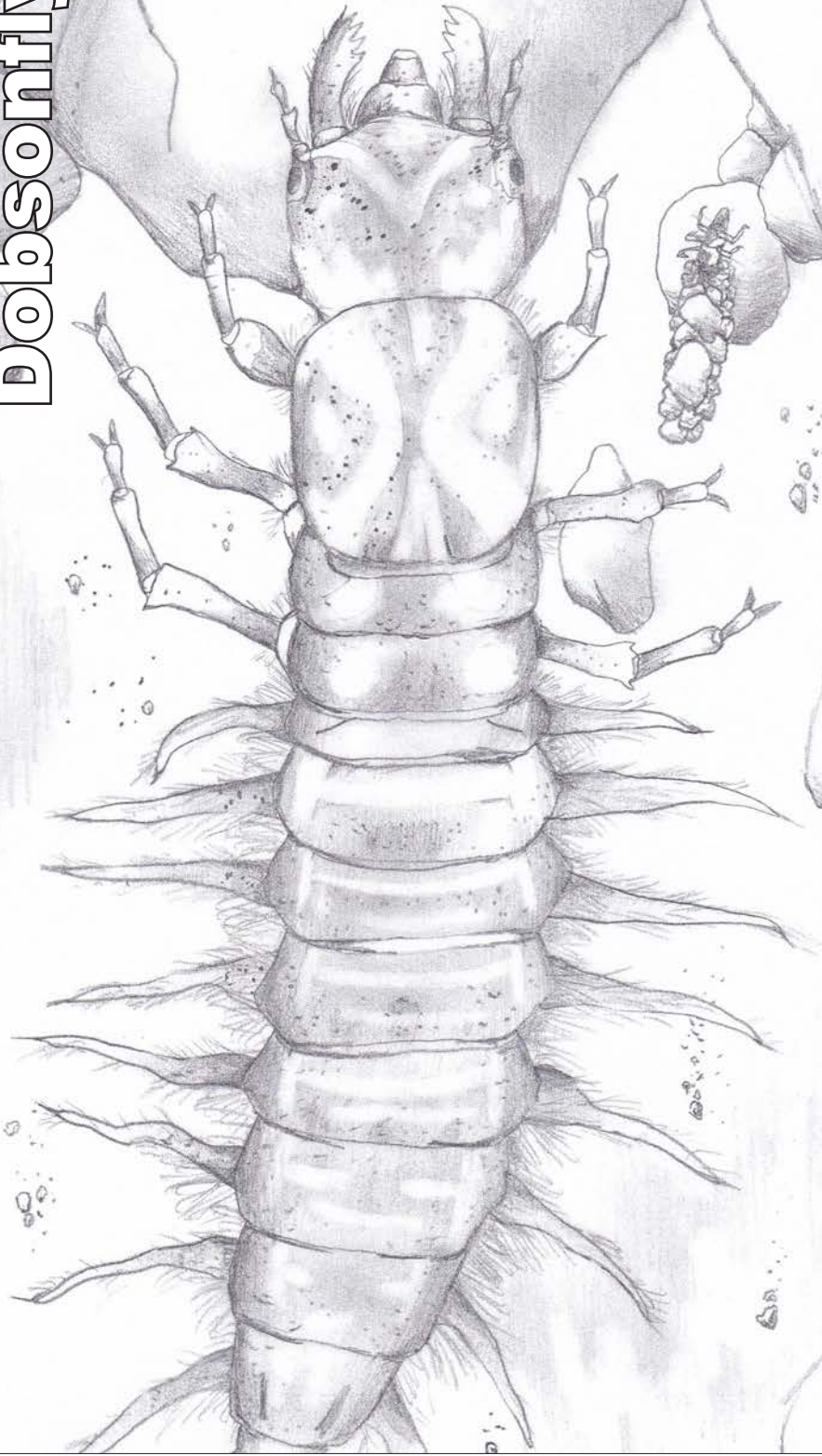


Adult Male Dobsonfly

Fun Fact: Hellgrammites spend 3-4 years as larva in water, but adult dobsonflies live for only 3-10 days.

Heiligrammite

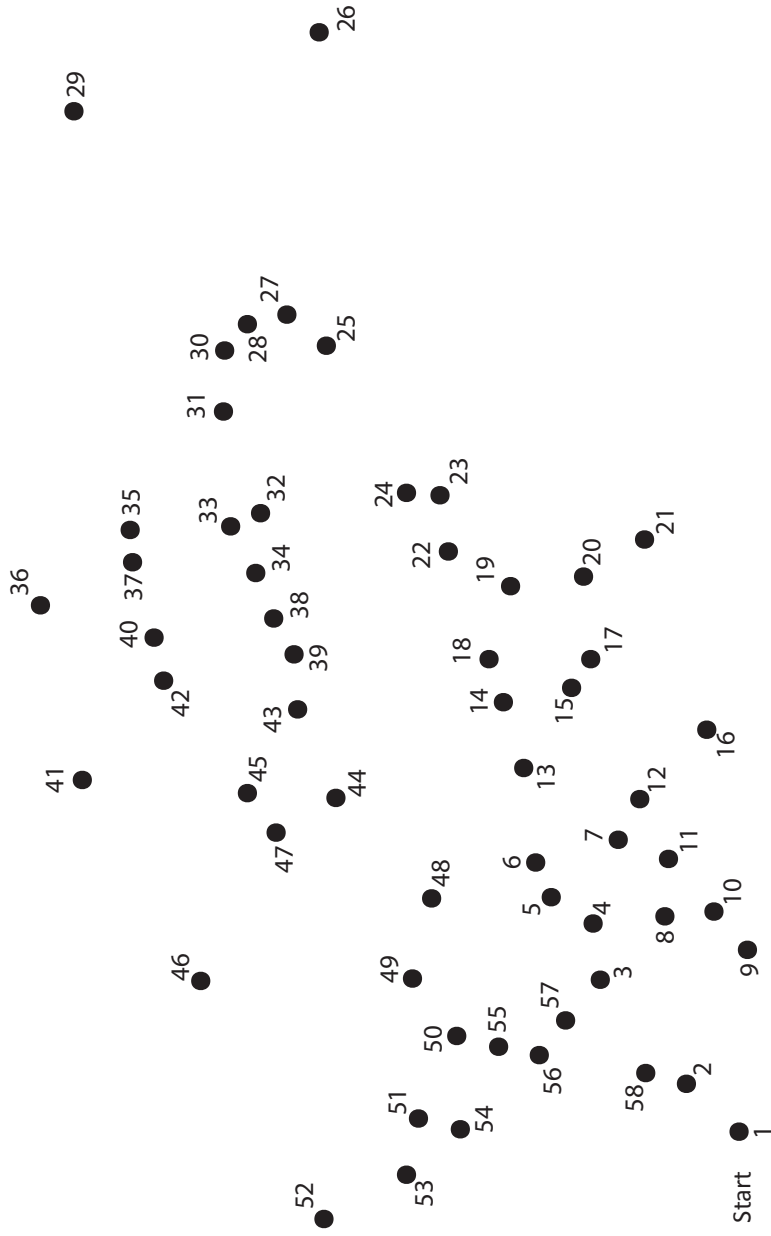
Dobsonfly Larva



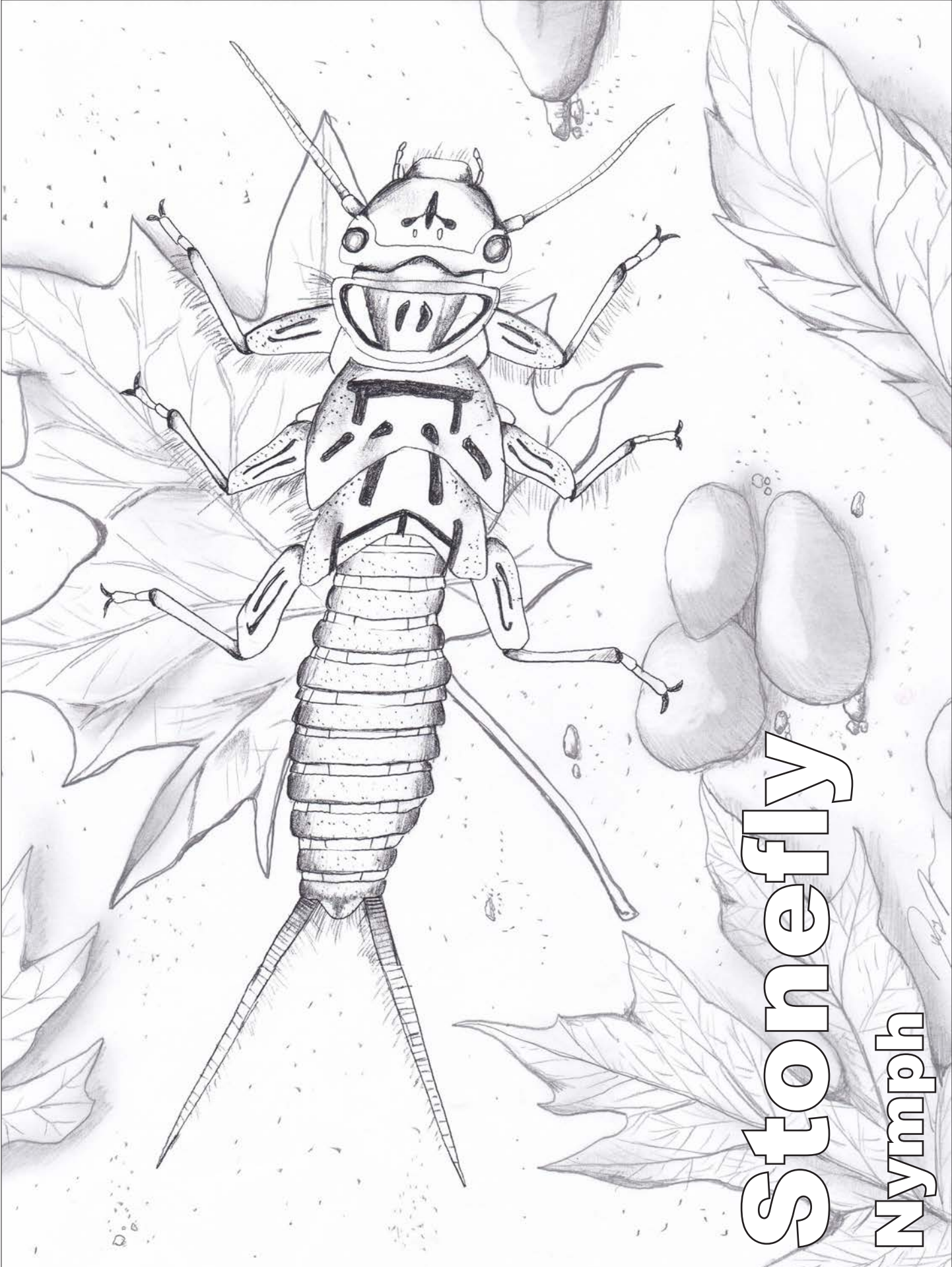
Stonefly Nymph

Stoneflies are **predators** that can be found in rivers and streams. They have six legs and two hair-like tails. The stonefly **lifecycle** starts with an egg, followed by **nymph** and then adult. This type of lifecycle is an example of **incomplete metamorphosis**. Stoneflies are very **sensitive to pollution** and are only found in very high-quality water.

Activity: Connect the Dots
to draw a **stonefly nymph**.



Fun Fact: Stonefly nymphs breath oxygen in the water through gills on their sides. They will sometimes do push-ups in the water to help push air through their gills.

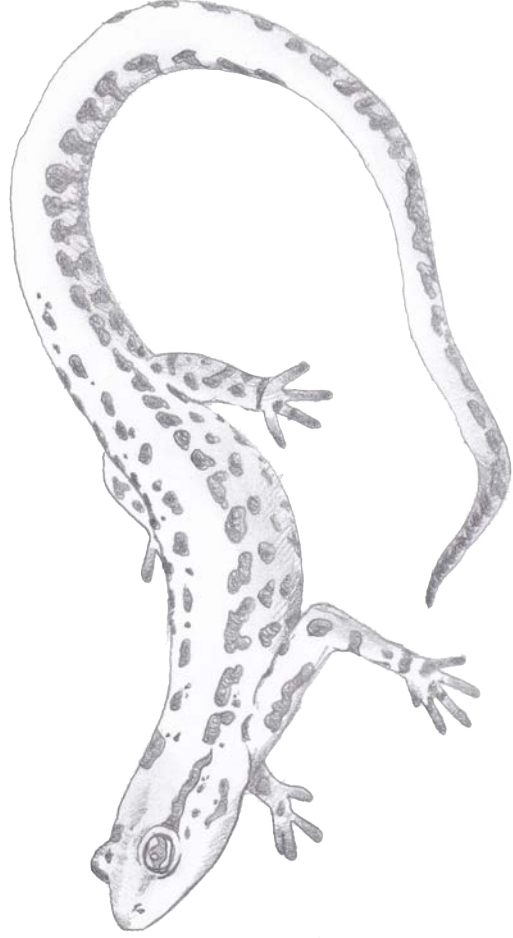


Stonefly
Nymph

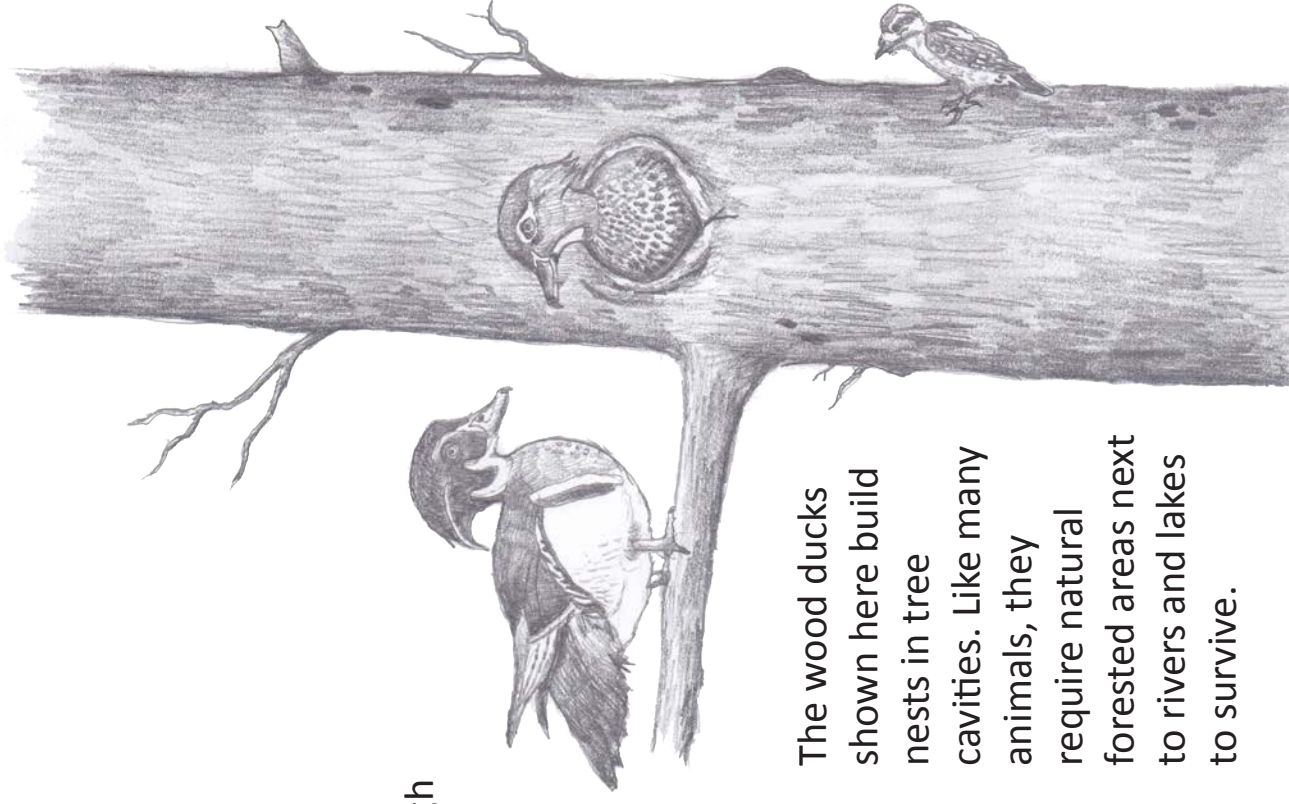
Habitat Protection

The ODNR, Division of Natural Areas and Preserves (DNAP) identifies and protects the highest quality lands and waters in Ohio. DNAP also manages the Ohio Scenic Rivers Program and the Ohio Natural Heritage Database, which documents Ohio's rare plant and animal species.

State Nature Preserves and Scenic Rivers protect and provide high quality habitat for all of Ohio's native wildlife from the smallest bugs to the largest birds and mammals.



Ohio is home to 25 species of salamanders. Salamanders need healthy streams and forests. Many of Ohio's nature preserves and scenic river lands offer healthy homes for salamanders.



The wood ducks shown here build nests in tree cavities. Like many animals, they require natural forested areas next to rivers and lakes to survive.

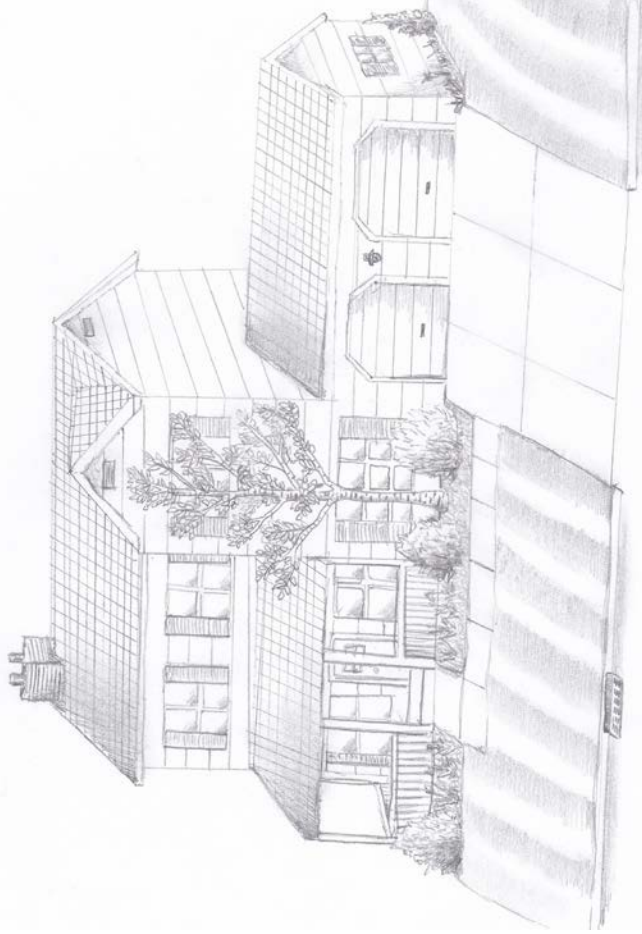


The Division of Natural Areas and Preserves manages Ohio's system of 137 state nature preserves. The division is responsible for monitoring Ohio's rare and endangered plants and animals, as well as managing Ohio's statewide system of 137 state nature preserves. By protecting high-quality landscapes, Ohio's rare and endangered plants and animals continue to thrive.

Activity: Seek and Find
Can you find all eight bugs
in the wildflowers below?



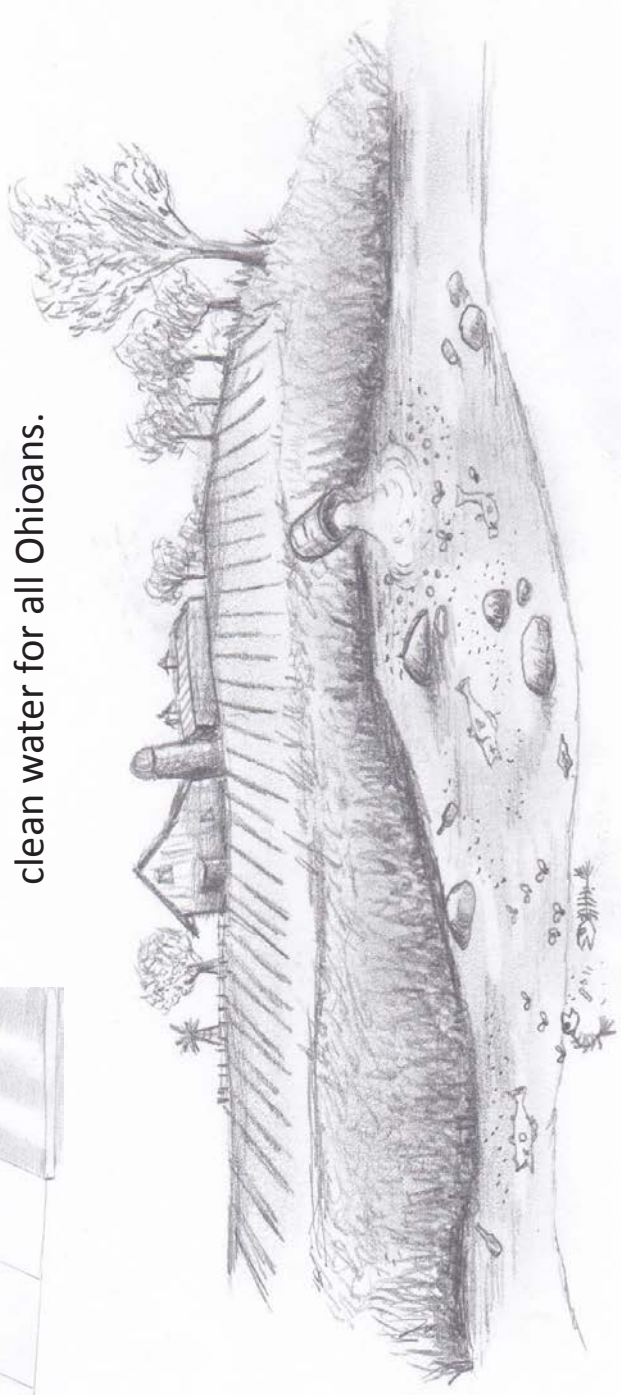
H2Ohio



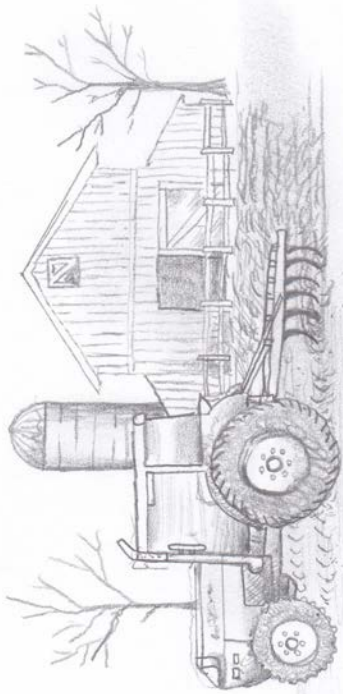
Fertilizers, pet waste, and lawncare products from homes can run off into nearby storm drains, which may be released directly into streams, especially during heavy rainfall.

Rain and snow deliver water to the surface of our lands. Some of this water may be absorbed by plants, soaks into the ground or is lost to evaporation. Excess water runs off the land transporting soil and nutrients to lakes and streams. This is called **runoff**. **Runoff** is a natural process, but too much fertilizer on lawns or farm fields adds too many nutrients to the runoff.

Without wetlands to filter runoff from our homes and farms, our streams and lakes will become polluted. By working with landowners, the H2Ohio program works to limit runoff and ensures safe and clean water for all Ohioans.



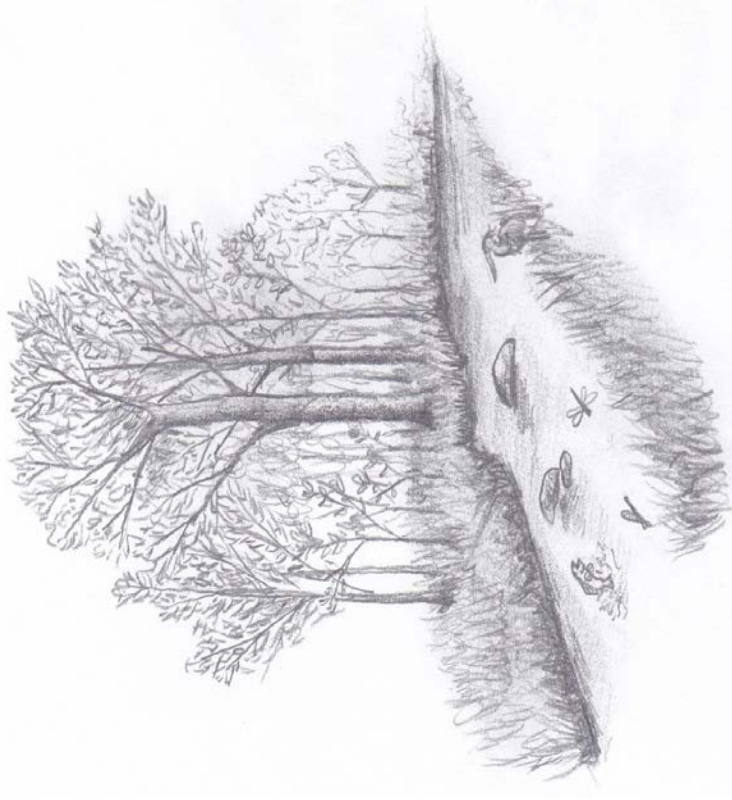
H2Ohio was created in 2019 to help keep Ohio's water resources healthy. Building wetlands is one way to protect our lakes and streams. Fertilizers help grow our food and keep our lawns green, but they can harm our rivers and lakes. Wetlands help us with this problem. Follow the pictures below to understand the cycle.



1 Rainfall can wash fertilizers off farm lands and lawns in to nearby streams. Excess fertilizer runoff in our lakes and streams can lead to algae blooms. Algae can cause a green film on the water's surface.



2 Wetlands slow the flow of fertilizer runoff before it can reach nearby streams and lakes. This allows wetland plants to filter out the fertilizer over time.

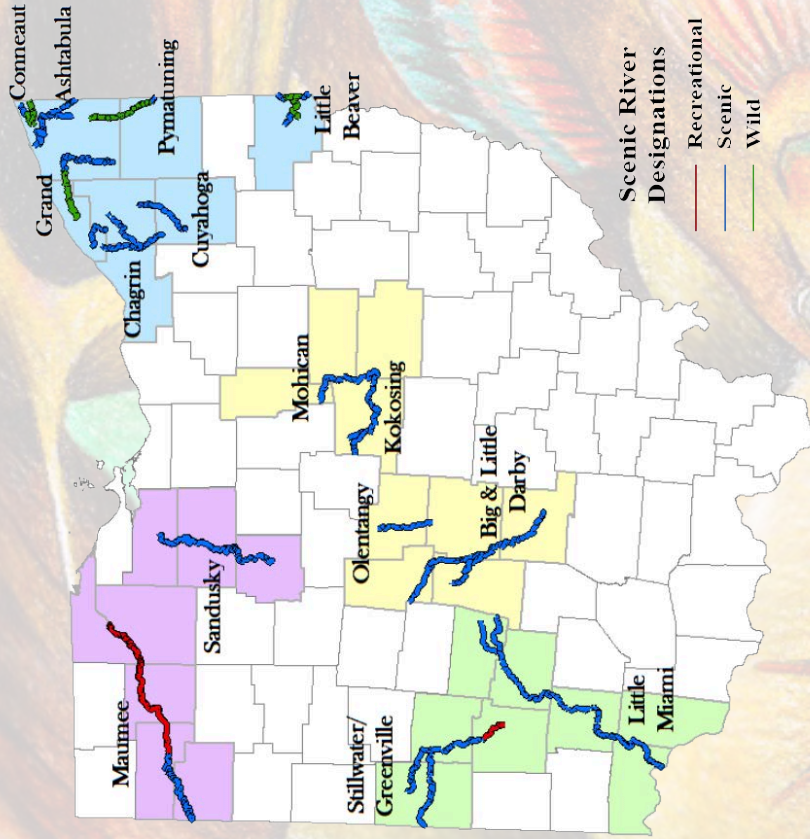


3 The filtered water from wetlands then flows into our streams and lakes, which prevents algae blooms and provides wildlife and people with clean, healthy water.



The mission of Ohio's Scenic Rivers Program is to protect the natural qualities of Ohio's remaining high-quality stream systems so present and future generations may experience their natural beauty and ecological values.

You can support Scenic Rivers by purchasing conservation license plates. Funds raised from license plate sales support stream quality monitoring, education efforts and land protection. Purchases of Scenic Rivers License Plates helped fund this publication.



For information regarding volunteering with the Ohio Scenic Rivers Program, including stream quality monitoring, workshops, clean-ups and field trips, please visit our website at: OhioDNR.gov.

ODNR Division of Natural Areas & Preserves, 2045 Morse Road, Building A, Columbus, OH 43229