Brookside Adventures Youth Education Booklet

Written, Formatted, and Prepared by

Patrick Allison Jr.

Youth Education Coordinator

East Quabbin Land Trust

East Quabbin Land Trust

Conserving the land, Preserving our heritage

TERRA CORPS

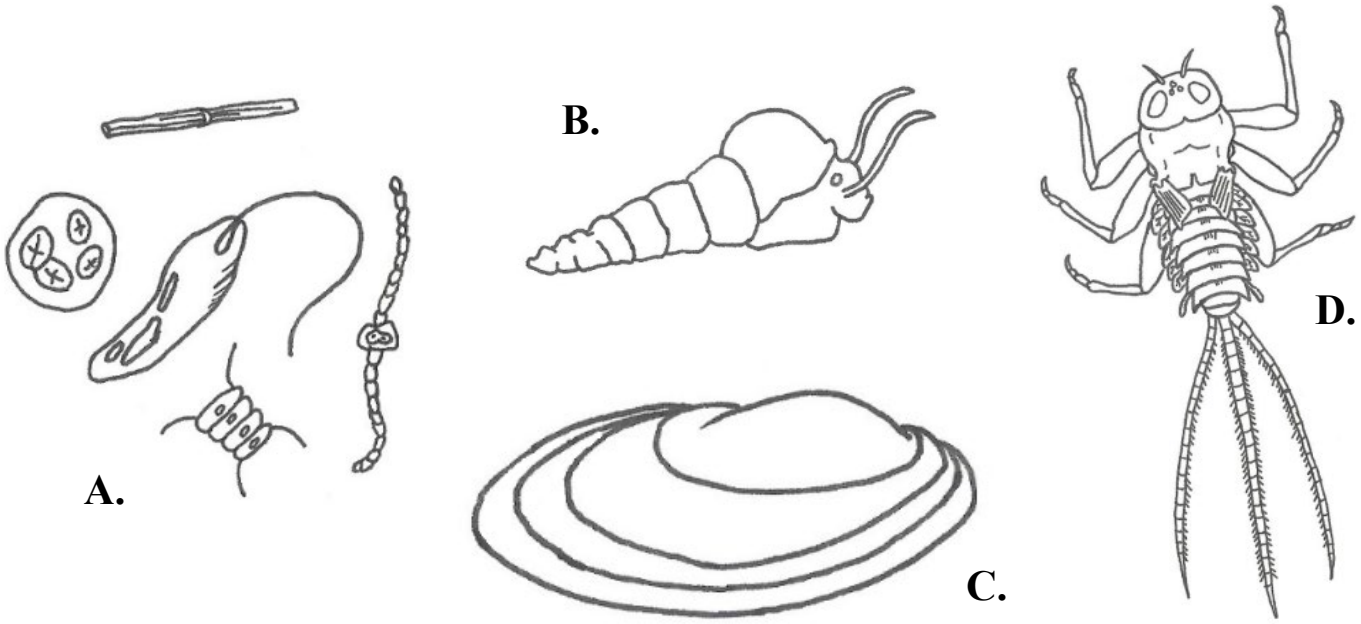
AMERICORPS

MASSACHUSETTS SERVICE ALLIANCE

Organisms of the Freshwater Ecosystem

Ecosystems are communities of organisms and their environment, all interacting with each other. The **organisms**, or anything living, that are part of these ecosystems can be many different shapes and sizes. Organisms that are **aquatic** live in the water.

Freshwater ecosystems include many different bodies of water such as lakes, ponds, rivers, streams, and wetlands. Freshwater ecosystems have much lower salt content than marine ecosystems. Let's learn about some of the organisms we might find in freshwater ecosystems!

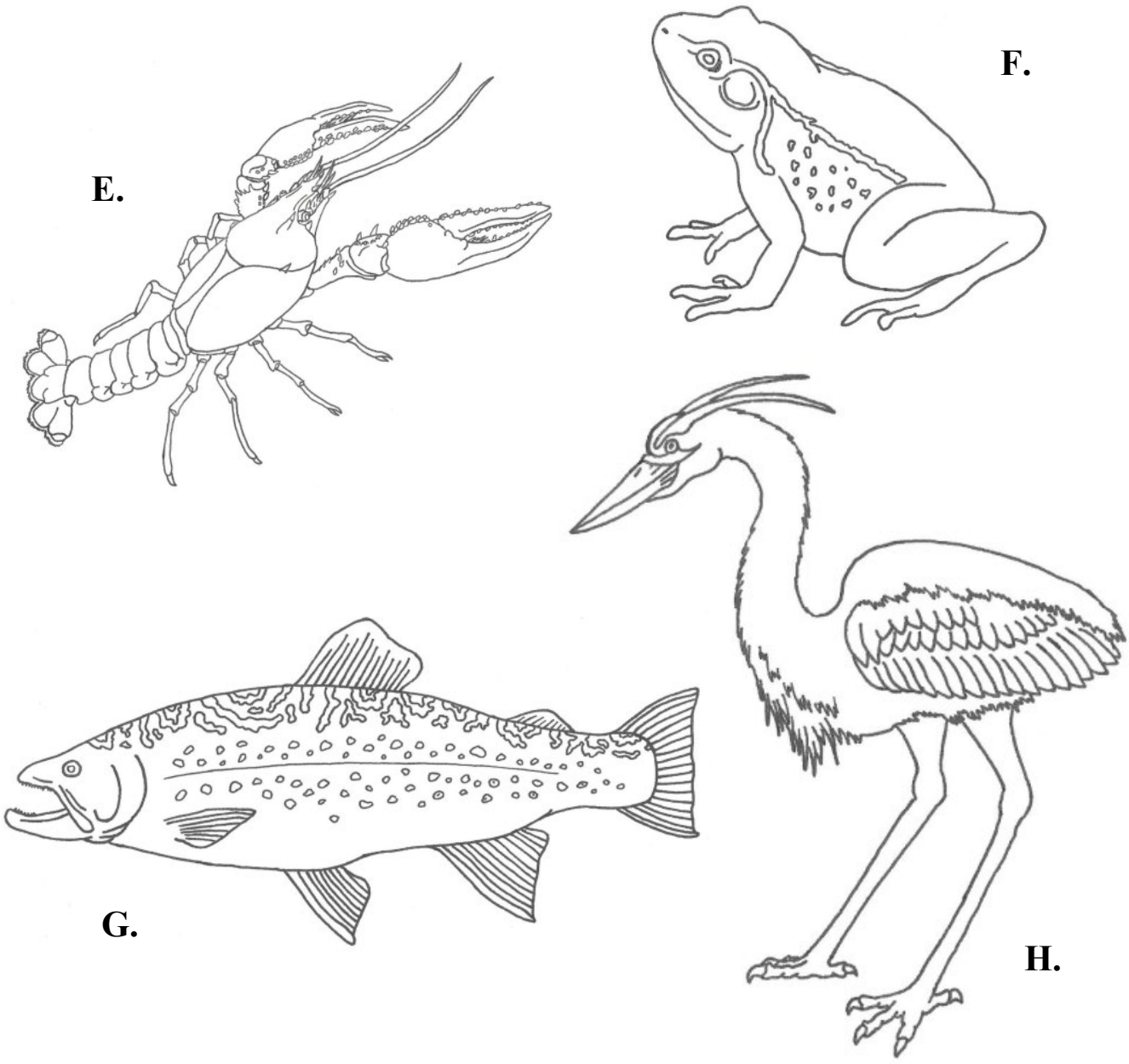


A. **Phytoplankton** and **Algae** are very small organisms that float through the water. They feed on sunlight, and are eaten by many different animals.

B. **Freshwater Snails** are slow-moving animals that usually eat plants and algae. They use their tongue-like "radula" to scrape food off of rocks and other surfaces.

C. **Freshwater Mussels** hide their soft bodies in their shell, and use a large "foot" to move around. They eat by filter feeding, sucking in plankton, algae, and other small food through a siphon.

D. **Aquatic Insects** live underwater when young, but many become adults that fly around on land. Many are sensitive to pollution. When mayflies, stoneflies, and caddisflies are not found in streams, it tells us that the water is unhealthy and dirty.



E. **Crayfish** are small crustaceans that look like little lobsters. They will eat almost anything they get their pincers on, and dig holes under rocks for protection from predators. When not in use by the crayfish, other animals can live in these holes.

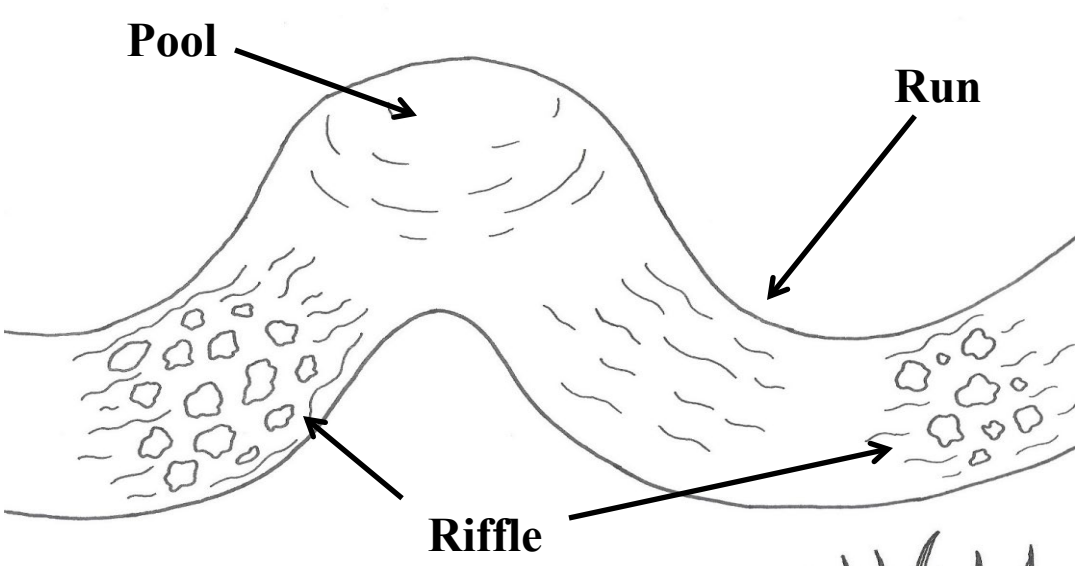
F. **Green Frogs** are amphibians, which are organisms that breathe through their skin. They like to rest near the edge of a pond or stream, where they can leap into the water to hide from predators.

G. **Brook Trout** are large fish that live in cold water streams. They can often be seen rising up to the surface of the water to eat insects floating downstream.

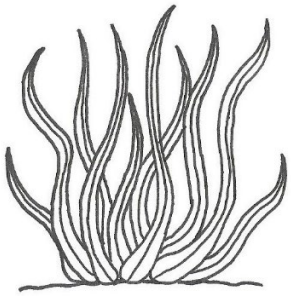
H. **Great Blue Herons** are birds and one of the largest predators of freshwater ecosystems. They walk through the water using their long legs and strike at food with their spear-like beaks.

Habitats of Freshwater Stream Ecosystems

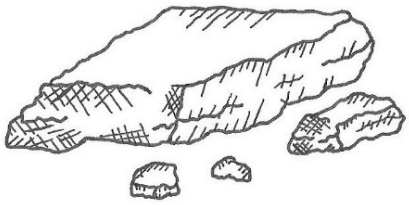
Let's take a closer look at stream **habitat**, a place where an animal lives! Some animals might prefer different parts of the stream, depending on how deep or fast the water is. **Riffles** are the fast, shallow parts of a steam, with rocks at the water's surface. **Pools** are deep and slow parts of the stream. **Runs** are the in-between, with moderate water flow and depth. In these areas of the stream, animals might find shelter in **leaf packs**, **aquatic vegetation**, **boulders/cobble**, or **woody debris**. Habitat is important for all animals, providing a place to hide from predators and find food!



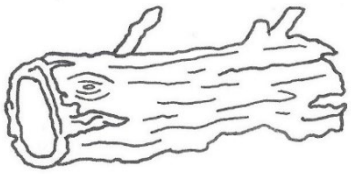
Leaf packs are piles of leaves on the stream bottom. Crayfish, snails, and insects love to hide here. The leaves can act as food too!



Plants living entirely or partially underwater are **aquatic vegetation**. This is a great place to hide if you're a fish, snail, or other animal!



Rocks are great shelter for animals, especially crayfish! **Cobble** are rocks around the size of your head, while **boulders** are much bigger!



Woody debris includes fallen trees, logs, and branches. Fish love this habitat, and large fallen trees can slow the flow of water.

Freshwater Organisms Crossword Puzzle

Q S A S N A I L F C O S S J R S D F
L P H Y T O P L A N K T O N F P D E

ALGAE
AQUATIC
CRAYFISH
ECOSYSTEM

D
Y
A
K

FROG
HERON
INSECT
MUSSEL

ORGANISM
PHYTOPLANKTON
SNAIL
TROUT

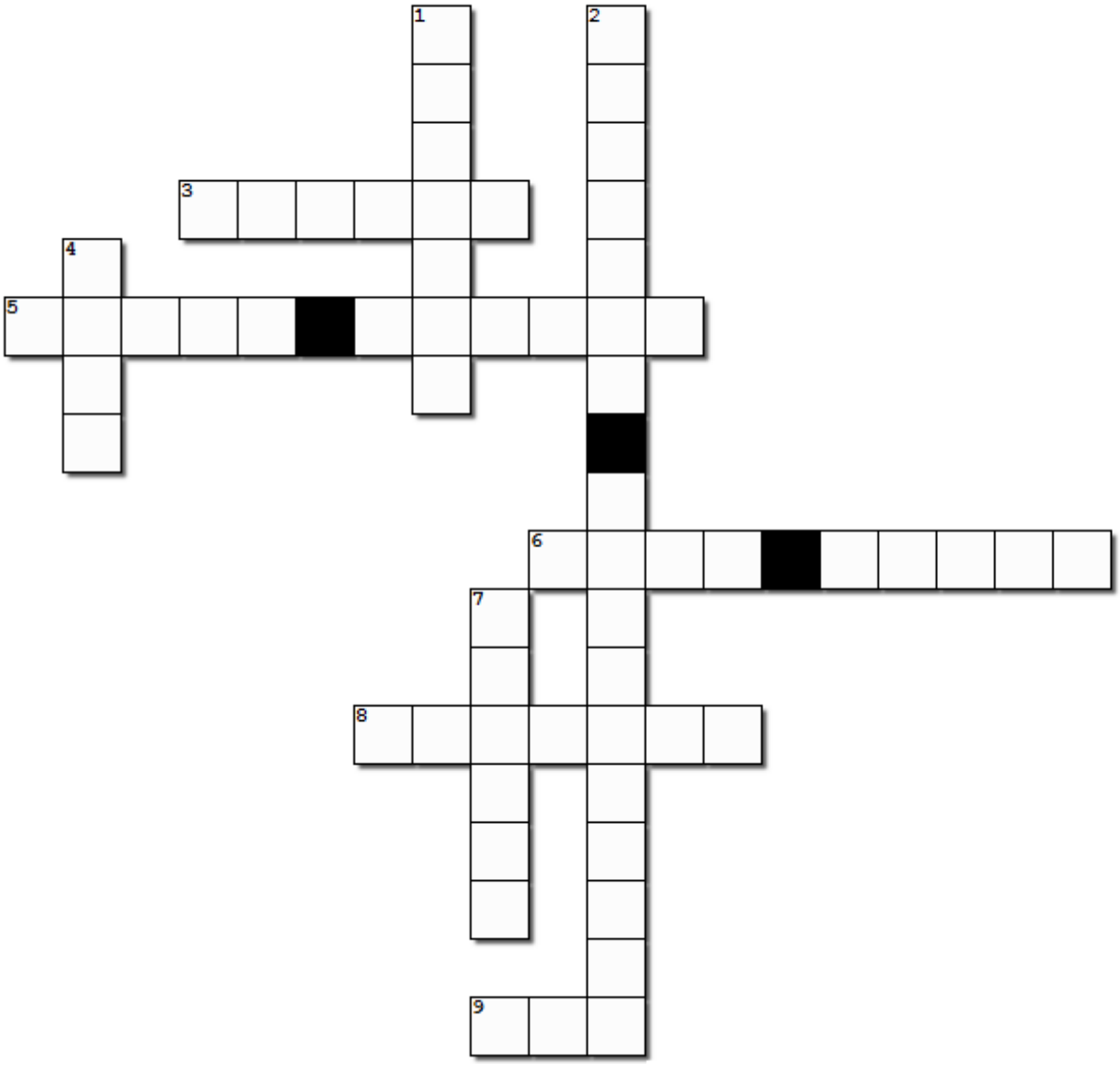
A Y Y K J T H Q A Z M J I E R F Y E
Q Y S A U O R G A N I S M C W L S O

Created using Word Search Generator on
Super Teacher Worksheets (www.superteacherworksheets.com)

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

Find the following words in the puzzle.
Words are hidden → ↓ and ↘ .

Freshwater Stream Habitat Crossword Puzzle



Created using the Crossword Maker on TheTeachersCorner.net

Across

3. Parts of a stream that are fast and shallow.
5. Fallen trees, logs, and branches in a stream.
6. Piles of leaves on the stream bottom.
8. A place where an animal lives.
9. Parts of a stream that have moderate water flow and depth.

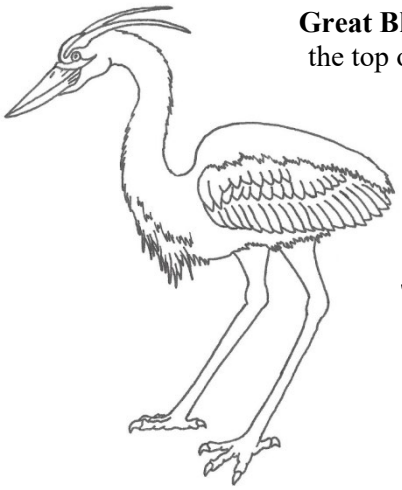
Down

1. Rocks in a stream much bigger than your head.
2. Plants living entirely or partially underwater.
4. Parts of a stream that are slow and deep.
7. Rocks in a stream around the size of your head.

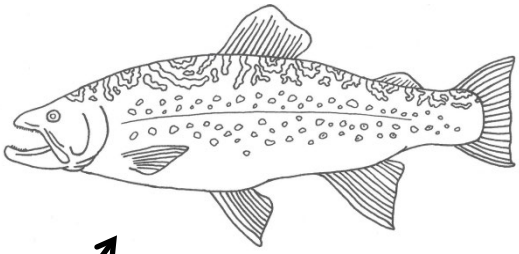
A Freshwater Food Web

A **food web** shows what different organisms eat, and how they are all connected to each other. Many organisms eat several different kinds of food. **Herbivores** eat plants and algae, **carnivores** eat meat, and **omnivores** eat both plants and meat. Each organism plays an important role, and if you removed just one of them, the entire food web will be affected! In the food web below, the arrows point from one organism (the food) to another organism that eats it.

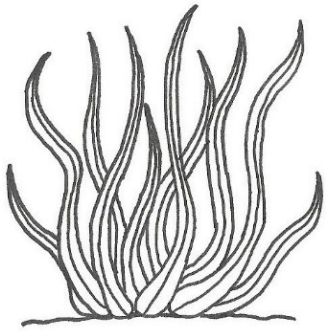
Great Blue Herons are at the top of this food web!

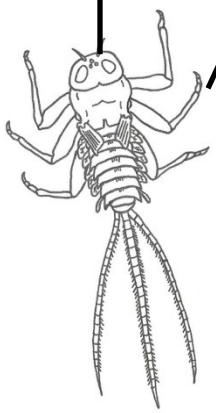


Brook Trout are one of the top predators of the stream, but will still be eaten by Great Blue Herons!

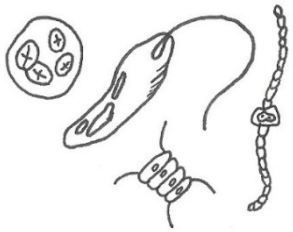


Crayfish are omnivores that eat almost anything! Think of them as the recyclers of freshwater ecosystems!





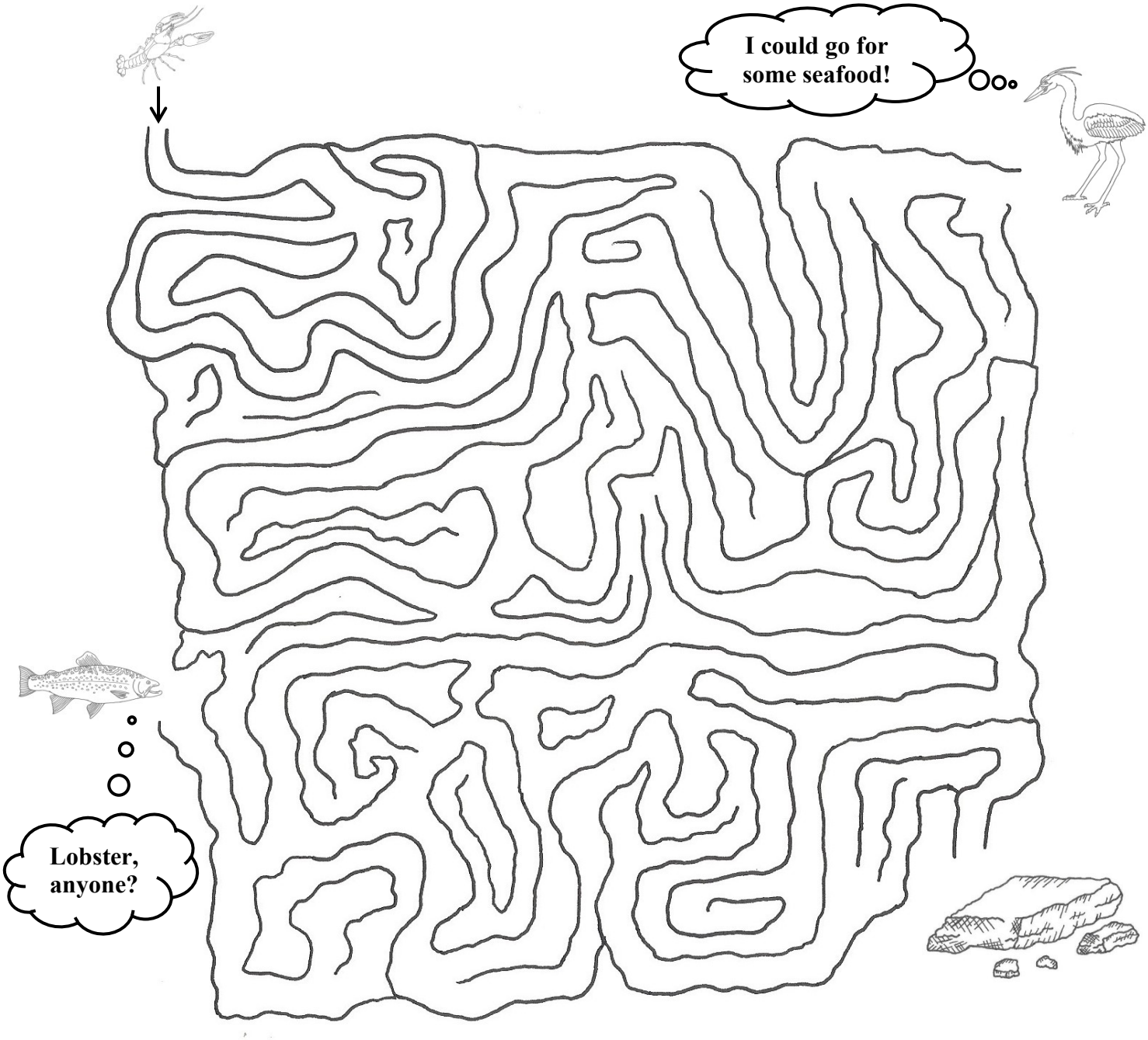
Phytoplankton, **algae**, **plants**, and **insects** are eaten by a lot of animals. Without them, the food web would fall apart!



Home is Where the Boulders Are

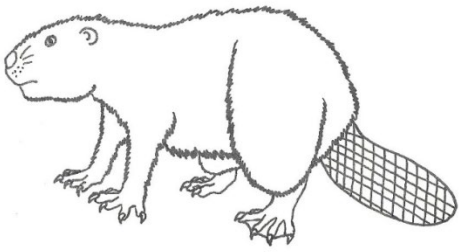
Quinn, the Quinebaug River Crayfish, is returning from her evening stroll along the stream bottom... But she is having trouble finding her slab boulder home! Can you help Quinn find her house?

Guide Quinn through the maze, but don't let her get caught by predators!

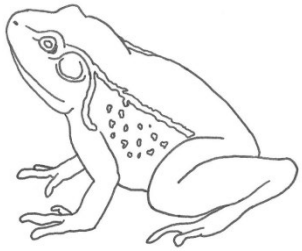


Animal Superpowers

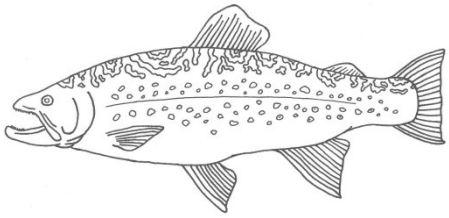
When organisms change to become better at living in their ecosystem, they are **adapting**. These changes are almost like "animal superpowers" that can change their appearance and abilities. It takes many generations for animals to change their form. Let's take a look at the animal superpowers of several freshwater organisms!



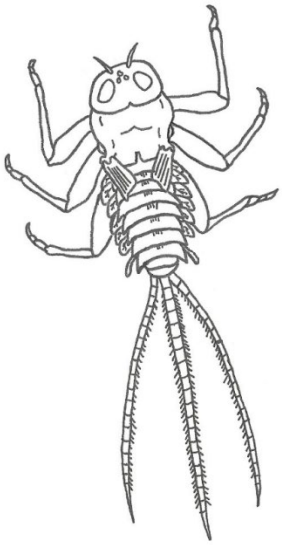
American Beavers have webbed back feet and a paddle-like tail to help them swim!



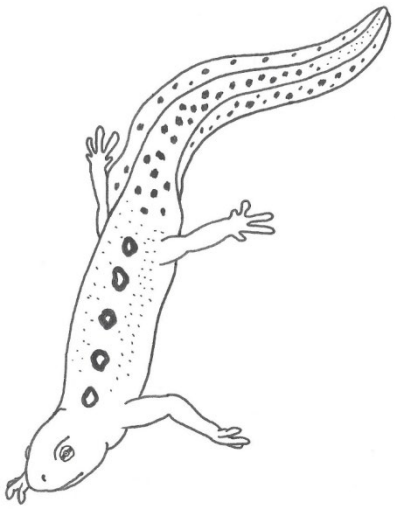
Green Frogs have long, strong back legs to jump far and can sing loudly using their throats!



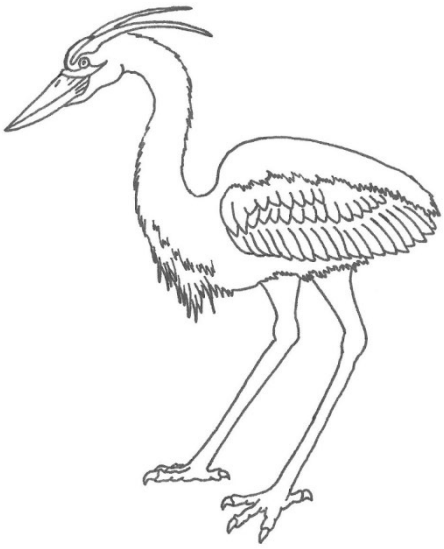
Brook Trout use their fins to help them swim, and breathe underwater through gills!



Mayfly nymphs have gills on their abdomens to breathe underwater and long tails to sense the world around them!



Eastern Newts have long, paddle-like tails to help them swim underwater and poisonous skin to protect themselves from predators!



Great Blue Herons can fly with their large wings and walk through deep water using their tall legs!

If you could have a superpower, what would it be?

_____

_____

Create Your Own Aquatic Organism

Can you make your own aquatic organism? What animal superpowers would it have? Can it go on land, or does it need to stay in the water? Is it a fish, an amphibian, a plant, or something new to science? What does your organism eat?

Draw your organism below and write some facts about it!

Additional Activities

Here are some additional activities you can do to help you and others learn about your local freshwater ecosystems!

1. Become the Teacher

- Use this booklet to help you teach others about freshwater ecosystems! Start by telling your adults about some of the animals and habitats you learned about!

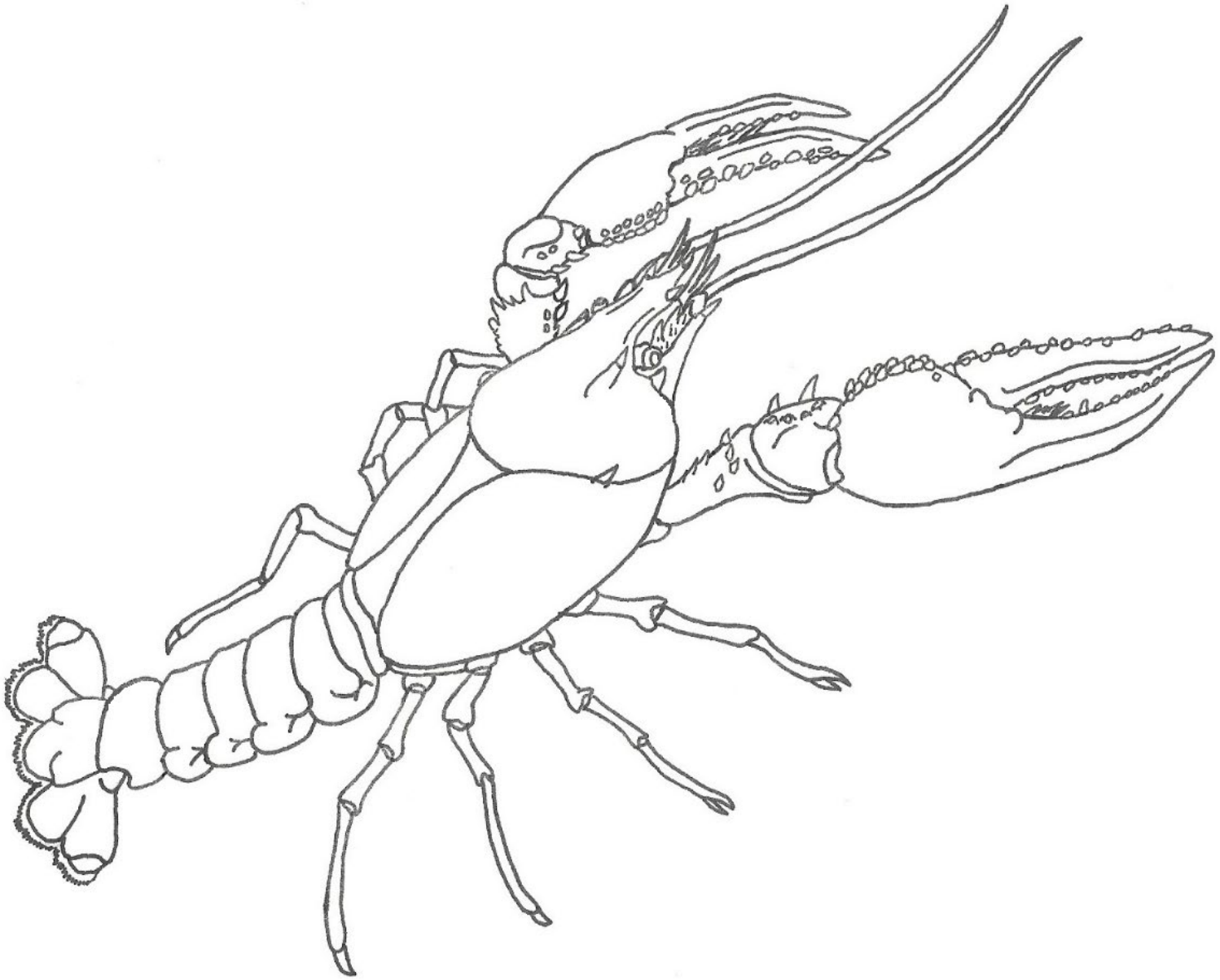
2. Create a Paper Freshwater Ecosystem

- You saw a lot of freshwater animals and habitat in this booklet... Can you put everything together?
- Take some colored paper and cutout the animals and habitat from this booklet. Glue or tape them onto the paper to make your own stream ecosystem!
- If you don't want to cut up the booklet, take some paper and draw the animals and habitat using crayons or colored pencils!

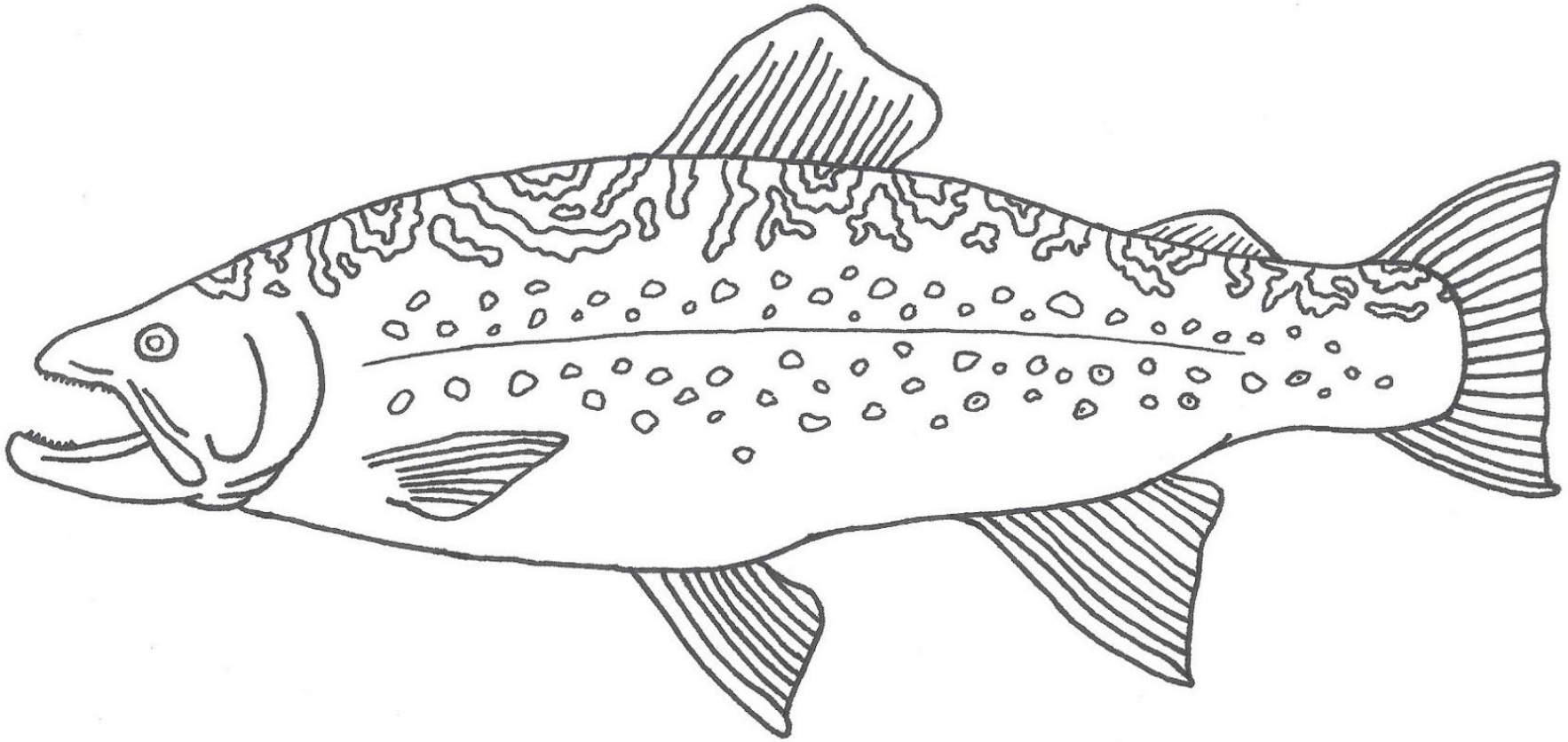
3. Explore Your Local Freshwater Ecosystem

- During the late spring, summer, and early fall, the local streams will be warm enough to explore. Take some time with your adult to check out your local freshwater ecosystem!
- Flip some rocks down in the shallows of the stream and look for different organisms. Can you find some of the animals from this booklet?
- Follow the rules of the Freshwater Ecosystem! They are...
    - Never throw trash into a stream; always keep garbage with you and throw it away in a trash can!
    - Never build rock dams or stack rocks on top of each other; this harms the stream and removes habitat for animals to hide under!
    - Leave all animals where you found them; you wouldn't want a giant to come steal you from your home, would you?
    - HAVE FUN! You will never forget the days you played down at your local brook!

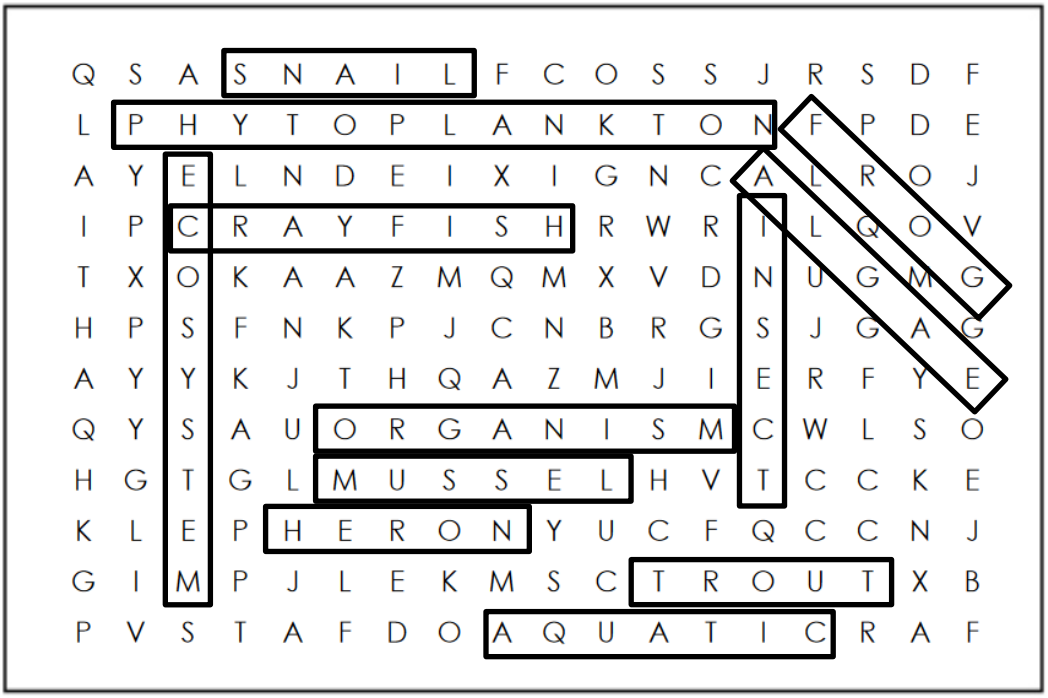
Coloring Page

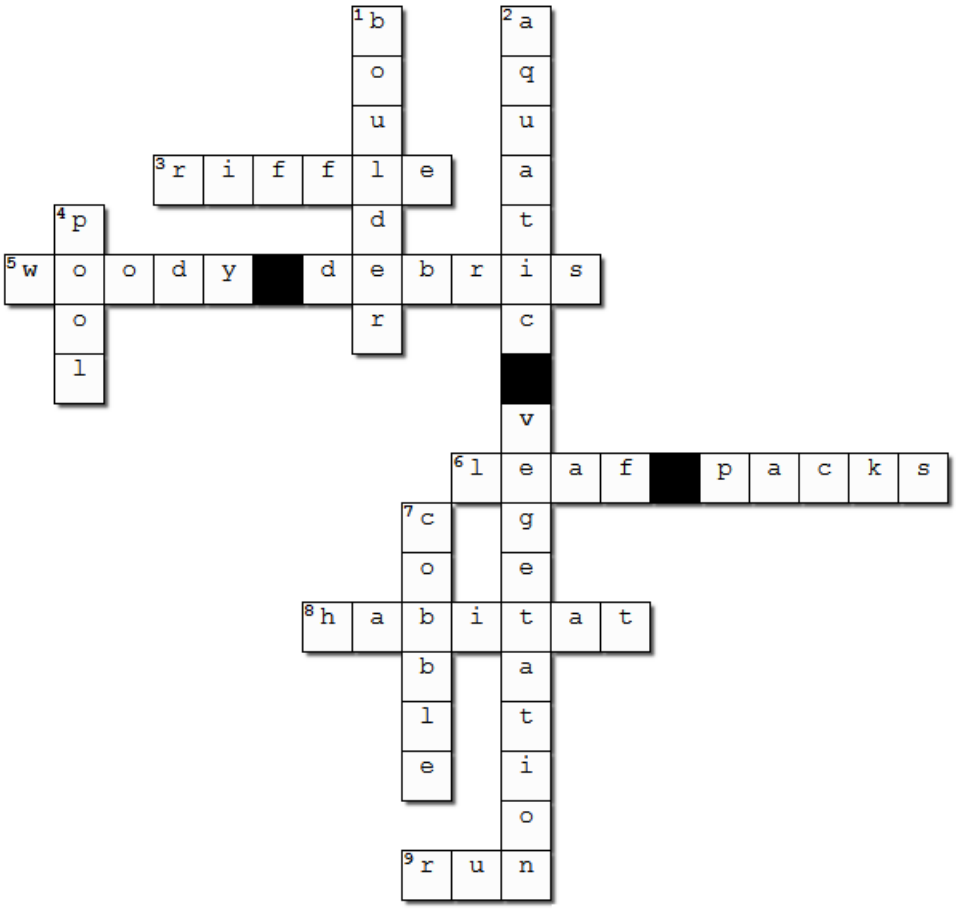


Coloring Page

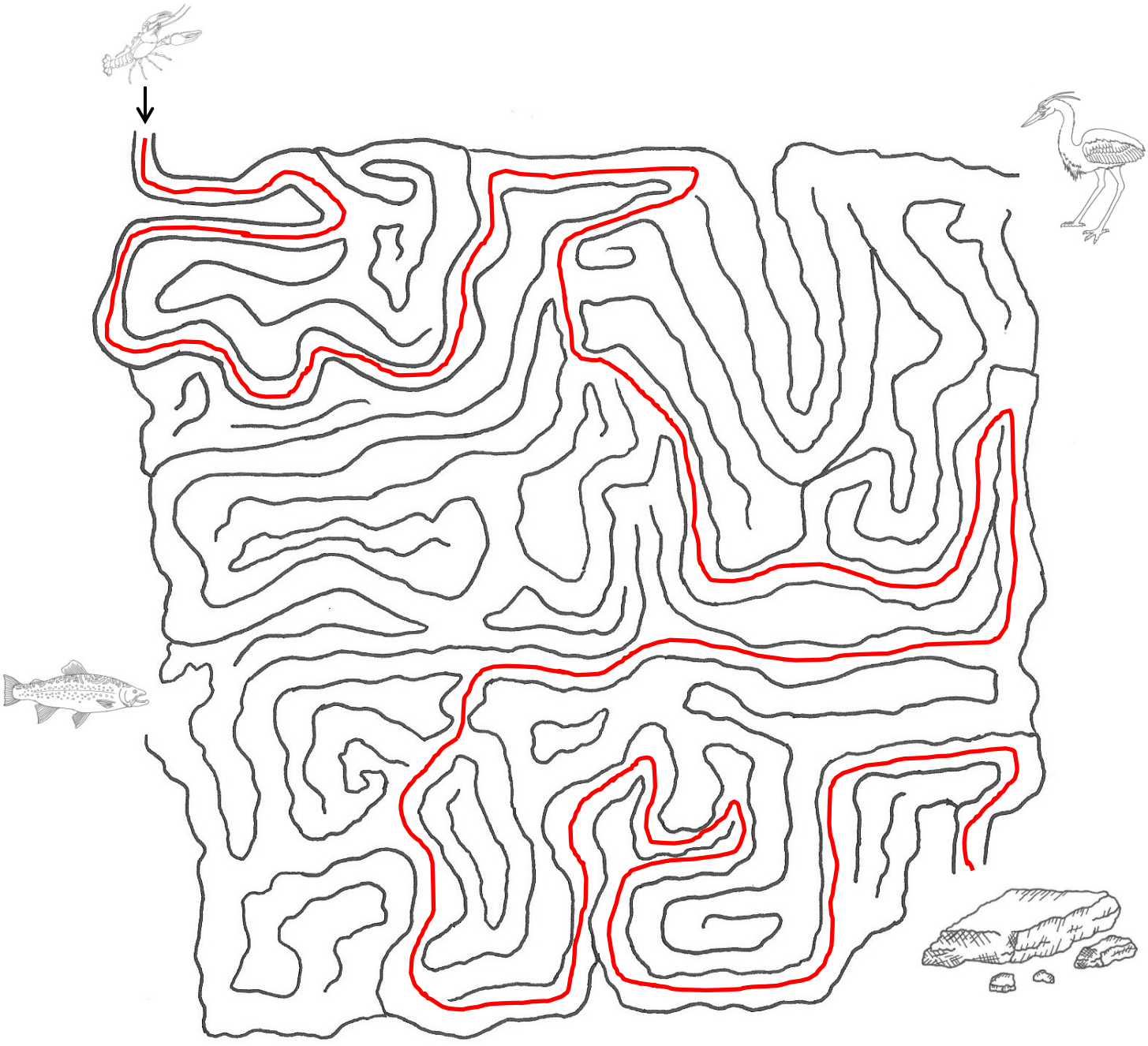


Answer Key


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


1 b o u
2 a q u a t
3 r i f f l e
4 p
5 w o o d y d e b r i s
o
l
r
c
v
6 l e a f p a c k s
7 c g
o e
8 h a b i t a t
b a
l t
e i
o
9 r u n

Answer Key



Useful Links and Contact Information

Online Resources

- www.macroinvertebrates.org/
  - By far and away the best online key I've used for macroinvertebrates; there are a lot of great pictures on here that will help you identify the aquatic insects in your local streams!
- https://stroudcenter.org/macros/
  - Stroud Water Research Center in general is amazing, and they have fantastic resources for macroinvertebrates!
- https://ctdeep.maps.arcgis.com/apps/MapJournal/index.html?appid=b9b8fa8441ac4ccab088db6c38ff0500
  - This is an atlas of the crayfishes of Connecticut; this will help you identify most of Massachusetts's crayfish species!
- http://www.biodrawversity.com/pubs/Chapter5.pdf
  - This document has species profiles for the freshwater mussel species of Massachusetts's Connecticut River watershed; this will help identify mussels from western and central parts of the state!
- https://modelmywatershed.org/
  - This is a great website for looking at details about your local watersheds!

Contact Information

- **Patrick Allison Jr.**
  - Email (Service): YouthEducation@EQLT.org
  - Email (Personal): pfallisonjr@gmail.com

- **East Quabbin Land Trust**
  - Website: https://eqlt.org/
  - Phone #: (413) 477-8229
  - EQLT Office Email: eqlt@comcast.net

East Quabbin Land Trust

Conserving the land, Preserving our heritage

TERRA CORPS

AMERICORPS

MASSACHUSETTS SERVICE ALLIANCE