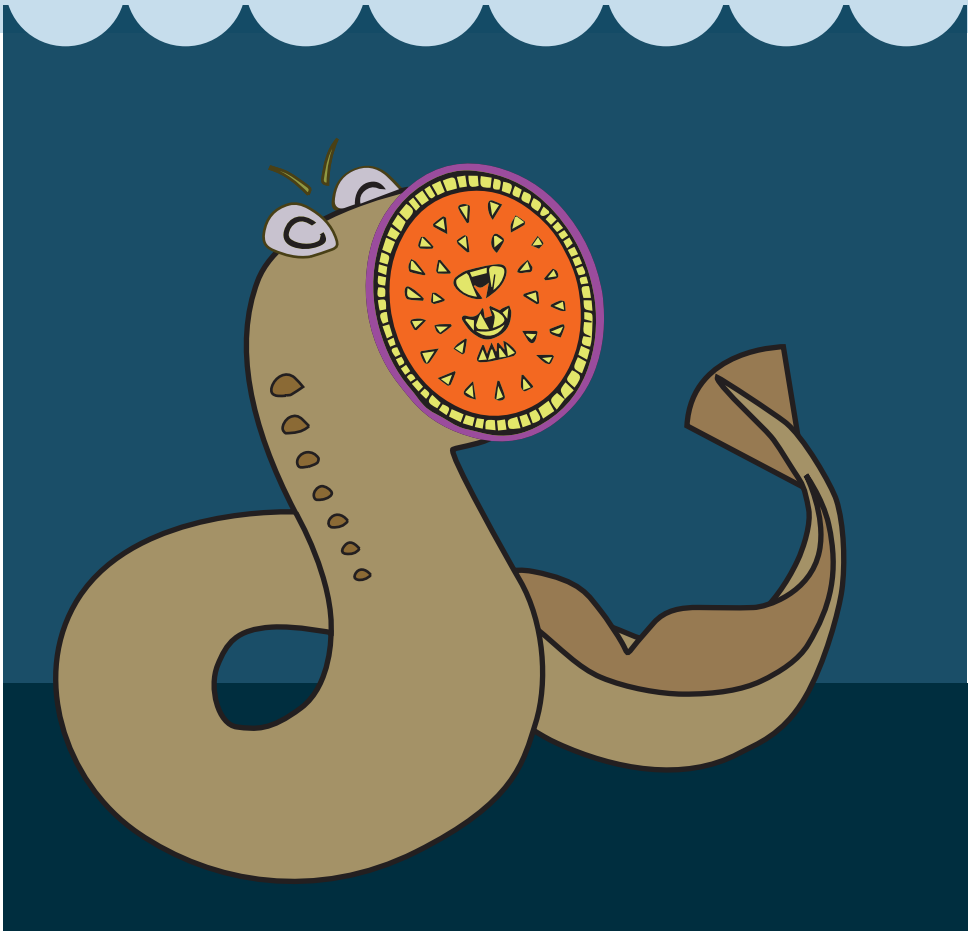
GREAT LAKES FISHERY COMMISSION

PROTECTING OUR FISHERY

ACTIVITY BOOK

SEA LAMPREYS

GREAT LAKES INVADERS



WHAT ARE THESE CRAZY CREATURES?

Sometimes referred to as **vampire fish**, sea lampreys are primitive, jawless fish that are older than dinosaurs! They have a suction cup mouth with over 100 teeth which they use to attach to other fish, and a file-like tongue they use to bore holes through the fish and suck their blood.

A SEA LAMPREY ATTACHED TO A LAKE TROUT

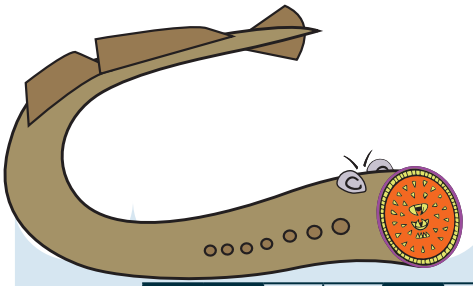
Sea lampreys are **native** to the Atlantic Ocean, where they aren't a problem for fish. Unfortunately, sea lampreys are **invasive** to the Great Lakes, and a big problem! They entered the lakes through shipping canals built in the 1800s, allowing them to swim into Lake Ontario from the ocean. Sea lampreys were stuck in Lake Ontario because Niagara Falls blocked their path to Lake Erie. In 1919, the Welland Canal, which connects Lakes Ontario and Erie, was deepened, and sea lampreys used the route to swim into Lake Erie by 1921, then into Lakes Huron and Michigan by 1937, and finally Lake Superior by 1938.

Sea lampreys attack most species of large Great Lakes fish. Each sea lamprey can kill up to **40 pounds** of fish in its lifetime!

Read on to find out more about sea lampreys, how the Great Lakes Fishery Commission and its partners are working to control them in the Great Lakes, and how you can be a part of the solution!

DIRECTIONS

A sea lamprey just swam by and knocked a bunch of letters from the puzzle to the bottom. To answer the following question, use your knowledge from page 2 and the letters located below the puzzle. Use trial and error to fill in the blanks until you have a finished puzzle and an answer to the question! *Hint: The letters only go into the blanks directly above them, not the blanks to the left or right (the arrow below shows an example).*



Where are sea lampreys found in the Great Lakes region?

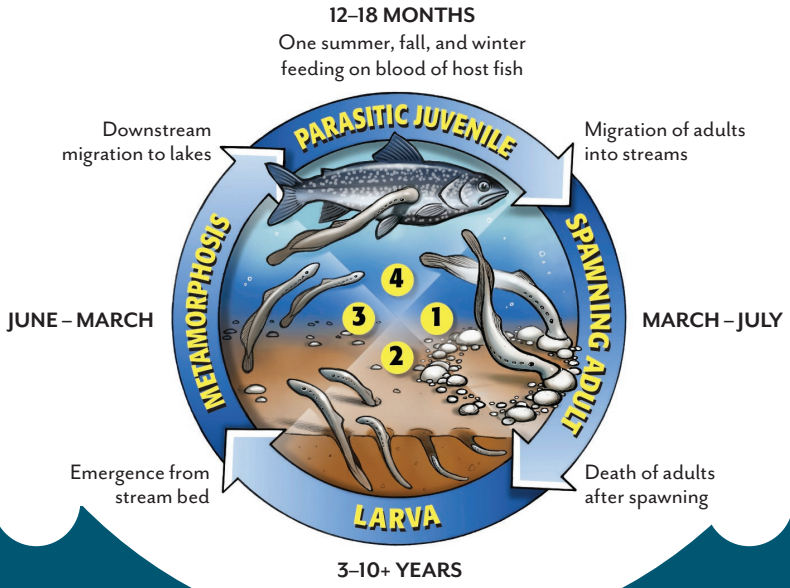
		I	N		L		K					
			N	T				O				
				E		H	U	R				
		M			H	I			N			
	N	D			U		E	R			R	

R O

O I C A I A S O

A E R I S A P G E I N

Answer on page 18.



SEA LAMPREY LIFE CYCLE

Adult sea lampreys **spawn** in gravel areas of streams, where they build **horseshoe**-shaped nests and their **eggs** are laid, fertilized, and hatched.

FUN FACT! A single female typically has up to 100,000 eggs. About 10% hatch, which makes up to 10,000 baby lampreys from a single male-female pair! *Woah!*

Upon hatching, baby sea lampreys—called **larvae**—burrow into the stream bottom where they will live for 3–10+ years as filter feeders. Once they reach 5–6 inches in length, a **metamorphosis** occurs in which the larvae develop a suction mouth, eyes, fins, and an appetite for fish blood. Now the sea lampreys are a **parasite** ready to eat! A **migration** into the lakes then occurs where parasitic sea lampreys feed for up to a year-and-a-half, afterward returning to streams for spawning.

LIFE CYCLE SCRAMBLE

1. Unscramble each of the clue words below. *(Hint: All the words relate to sea lampreys and are used on page 4.)*
2. Copy the letters in the numbered boxes to the boxes at the bottom of the puzzle with the same number to reveal a hidden phrase.

SEGG

VAALER

PEARAIST

TORSOPMAIHEMS

GIMITONRA

SANWP

SHOHREOSE

Answers on page 18.

DEVASTATION IN THE GREAT LAKES

After invading the Great Lakes, sea lampreys quickly began to devastate sport and commercial fish species, particularly lake trout.

By the time it was obvious that sea lampreys were a problem, it was too late for some lakes. Native populations of lake trout were gone from Lake Huron and Lake Michigan. However, control methods began before sea lampreys completely depleted lake trout in Lake Superior. The native lake trout population in Lake Superior survived the sea lamprey invasion!

Why do you think lake trout populations were destroyed by sea lampreys sooner in Lake Michigan and Lake Huron than in Lake Superior? *(Hint: Apply what you learned on page 2 and look at this map—where did sea lampreys first enter the Great Lakes?)*

No matter how hard we try to get rid of them, sea lampreys will always need to be controlled, and unfortunately it will be a costly, ongoing battle. But, Great Lakes fisheries are worth over 7 billion dollars. I'd say that's worth protecting! How about you?

SECRET CODE

Below are just a few of the many fish that sea lampreys latch on to. Use the letter key at the top to decode the secret message below by matching the fish.

A

LAKE TROUT

C

LAKE WHITEFISH

E

BURBOT

H

BROWN TROUT

K

FRESHWATER DRUM

L

WALLEYE

O

YELLOW PERCH

P

CHINOOK SALMON

R

NORTHERN PIKE

S

LAKE STURGEON

T

SMALLMOUTH BASS

Answer on page 18.

Fish images courtesy of the NOAA Great Lakes Environmental Research Laboratory

MAKE YOUR OWN SEA LAMPREY TALE!

Find a friend to come up with words to fill in the blanks below, but don't say what the story is about! Be sure to tell your friend the type of word you need (adjective, color, etc.). Once you have filled in all of the blanks, read the story to your friend.

Sea lampreys are _____ fish that live in _____.
adjective *location*

They have _____ skin, _____ eyes, and a
color *shape*

_____ mouth. If I ever held a sea lamprey, I would
adjective

probably _____ because they would smell like
(non-ing) verb

_____. If I were a lake trout, I would _____ the
stinky food *verb*

lamprey before it could attach to my _____.
fish body part

Thank goodness sea lampreys don't _____ people
verb

or else I would _____ away _____!
verb *adverb*

TONGUE TWISTERS

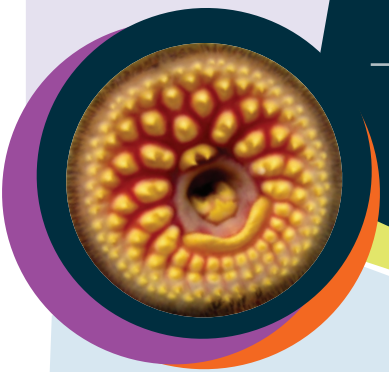
Can you say the phrases five times fast?

Suzy sea lamprey swims swiftly upstream to spawn.

Biologist Bri brings Brandon buckets bursting with bubbling lamprey bait.

Lithe* lampreys like licking leaky holes in lean lake trout.

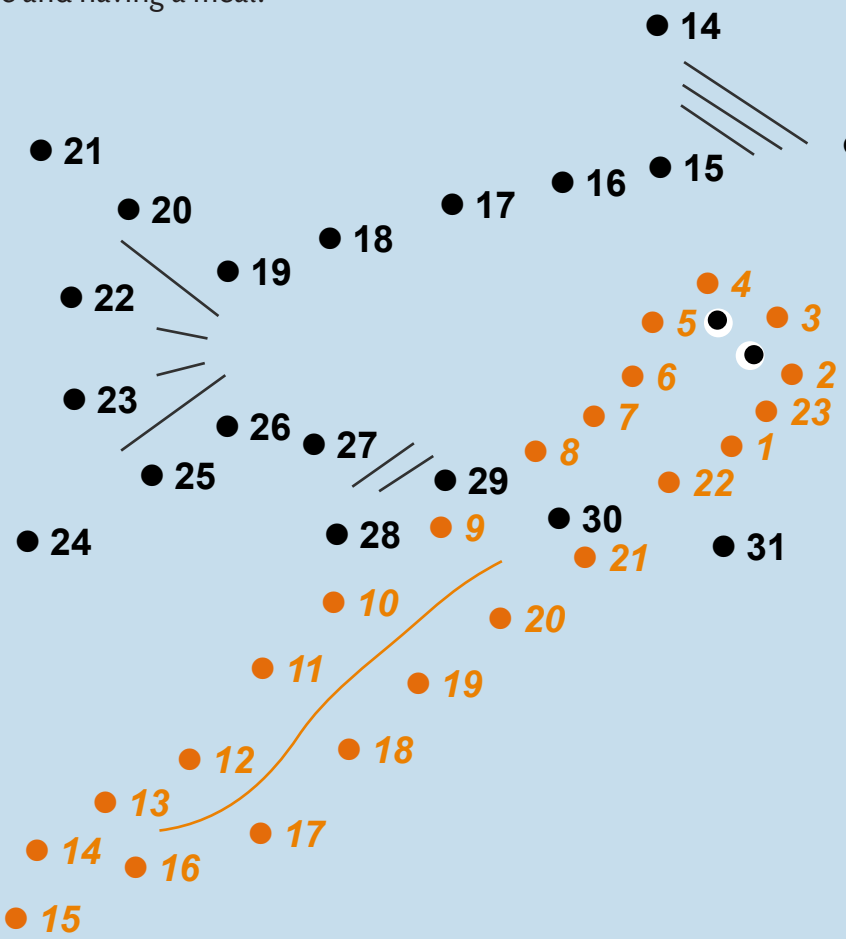
** Lithe is another word for thin!*

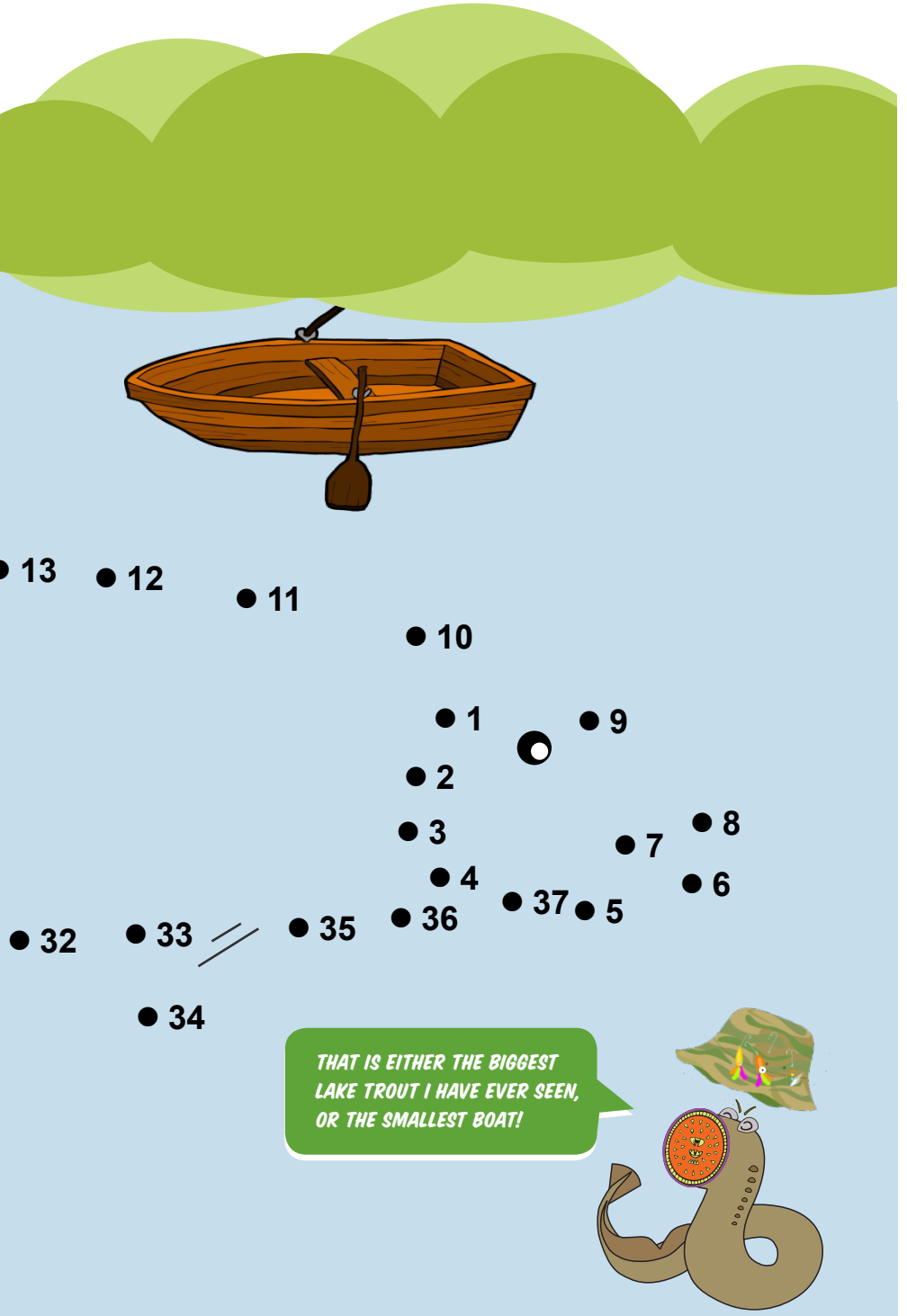


Write your own wacky sea lamprey tongue twister below!

CONNECT THE DOTS

Draw lines between the numbers to find the sea lamprey that is hitching a ride and having a meal!




13
12
11
10
1
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4
6
37
5
32
33
35
36
34
THAT IS EITHER THE BIGGEST LAKE TROUT I HAVE EVER SEEN, OR THE SMALLEST BOAT!

HOW ARE WE FIGHTING BACK?

In 1955, the **Great Lakes Fishery Commission (commission)** was established between the U.S. and Canada because both countries are affected by sea lampreys. The commission's main goal is to control the sea lamprey population in the Great Lakes. To do this, the commission cooperates with many partners.

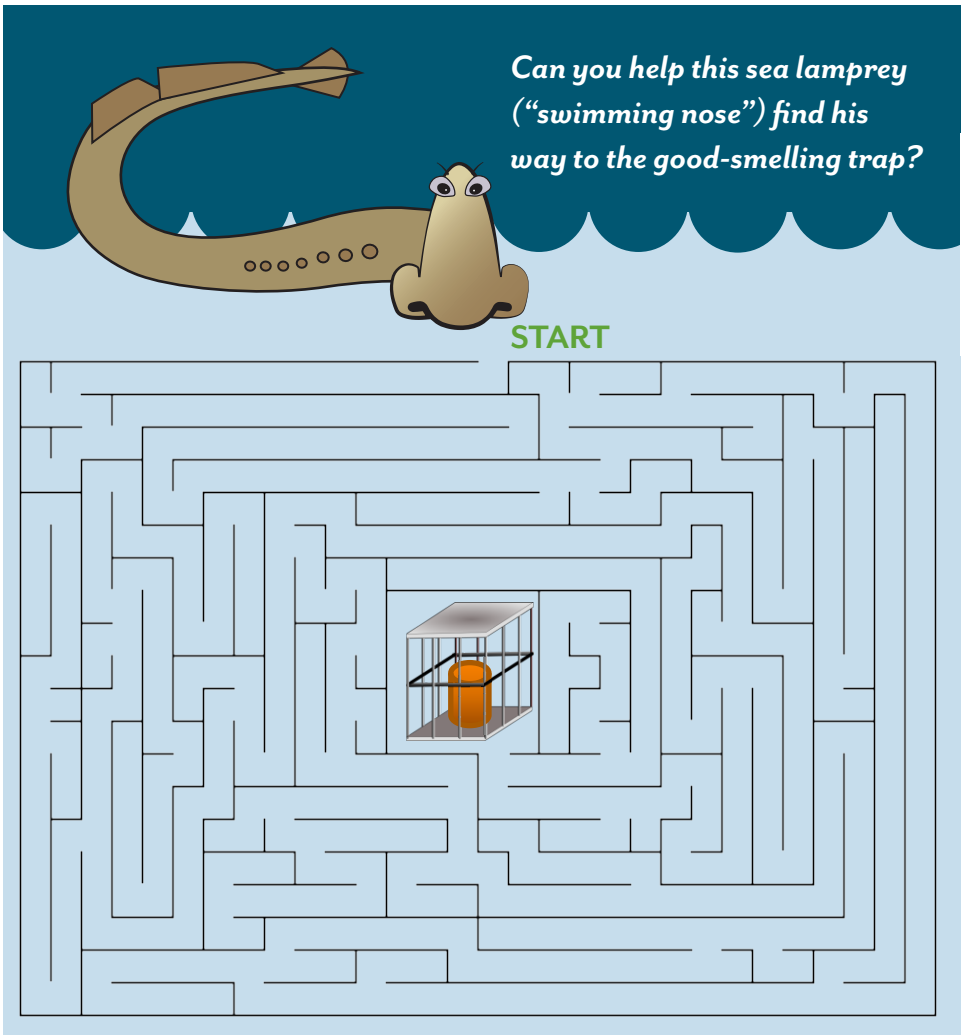
During the 1950s, the United States Fish and Wildlife Service, for example, tested over 6,000 chemicals and found two **lampricides** that were (and still are) successful at controlling sea lamprey larvae without harming other fish. Applications of lampricides in sea lamprey-infested streams are done by the **United States Fish and Wildlife Service** and **Fisheries and Oceans Canada**. The **United States Army Corps of Engineers** constructs barriers and traps, which block and capture adult sea lampreys before they can swim to spawning **habitat**.

Together, these techniques have reduced sea lamprey populations by 90% in most areas of the Great Lakes!

Additionally, research conducted by the **United States Geological Survey**, and other institutions, are investigating new control techniques by researching sea lampreys' scents, called **pheromones** (see activity, opposite page); finding ways to trap young parasitic sea lampreys; and, monitoring sea lampreys' movement throughout the Great Lakes.

THE NOSE KNOWS!

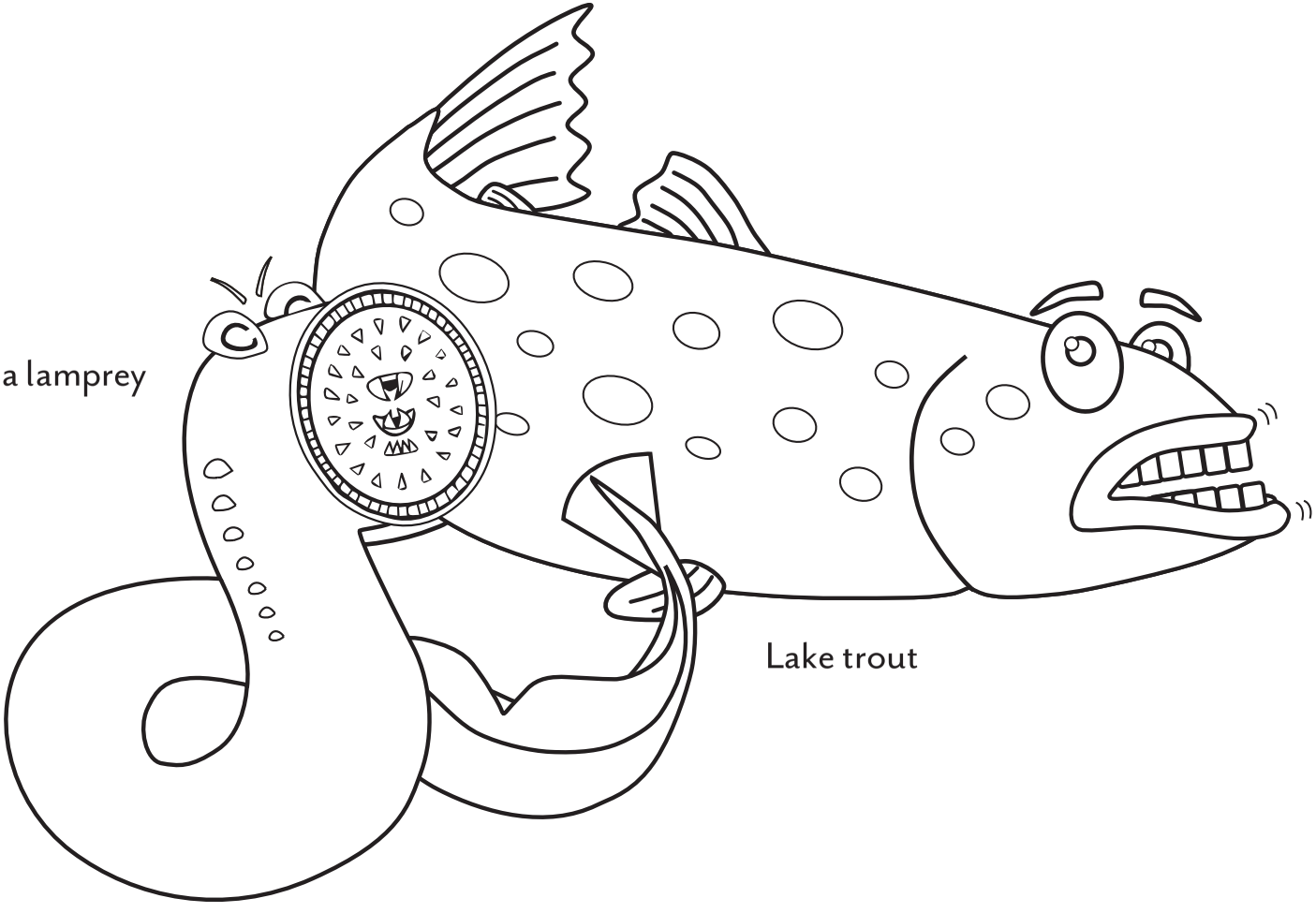
Sea lampreys are sometimes called "swimming noses" because they can detect smells in the water extremely well. Sea lampreys use this ability to find mates and good spawning streams. Biologists who are trying to control sea lampreys have found ways to use this keen sense of smell for their own purposes. By putting sea lamprey pheromones into the water, biologists can attract or repel sea lampreys. For example, pheromones can be used to lure sea lampreys into traps!



REFLECTING ON SEA LAMPREYS' SCENTS

Hold a mirror up to the paragraph below to reveal more cool information about sea lampreys!

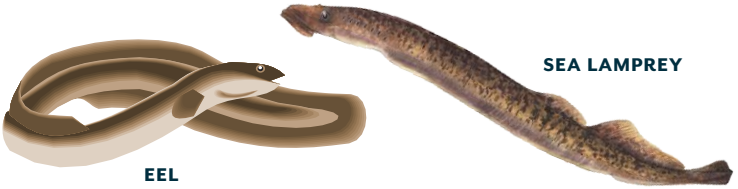
Sea lampreys hate the smell of other dead lampreys! If a sea lamprey smells a dead lamprey it will swim away fast. Biologists are using the scent of dead lampreys as a repellent to scare sea lampreys away from areas where they do not want them.


Sea lamprey
Lake trout

SOME FAQS ABOUT SEA LAMPREY

Are sea lampreys eels?

Sea lampreys are often called "lamprey eels," but they are not eels! Sea lampreys have a cartilaginous skeleton (like sharks) and are jawless, while eels (like salmon and us!) have a jaw and bony skeleton.



Are sea lampreys in our Great Lake?

Yes, unfortunately, sea lampreys are in all five of the Great Lakes.

How many teeth does a sea lamprey have?

We lost count after 100!
See if you can count them all!

Are sea lampreys going to get me while I'm swimming?

No, sea lampreys are too busy looking for their favorite food (fish) to focus on humans. Phew!

WORD FIND

Can you find the words below? Look hard! They could be horizontal, vertical, diagonal, forward, or backward. The first word is already circled to help you with your search.

WORDS

Vampire	Invasive	Control	Cartilage
Sea lamprey	Fishery	Lampricide	Vertebrate
Commission	Lake trout	Pheromone	Tongue
Great Lakes	Salmon	Trapping	Jawless

FINAL FOOD FOR THOUGHT

Did you know that sea lampreys are a delicacy in some countries, like Spain and Portugal? Who's hungry?

Thinking about tasting the next sea lamprey you catch on a salmon? Not so fast! Sea lampreys feed on the blood of top predator fish. Harmful chemicals, like mercury, are concentrated in the blood of these fish in the Great Lakes, so sea lampreys get big doses when they feed. Next time you're hungry for fish, stick to tasty salmon, lake trout, and walleye!

GLOSSARY

Commercial fishery: Business that catches and sells fish

Invasive species: A species not originally from an area that threatens the environment

Metamorphosis: A change from one form to another

Parasite: An organism that lives on another "host" organism, typically harming the host organism

Lampricides: Chemicals applied to sea lamprey-infested waters to control their population

ANSWER GUIDE

Fallen Phrase (page 3): In Lakes Ontario, Erie, Huron, Michigan, and Superior.
Life Cycle Scramble (page 5): eggs, larvae, parasite, metamorphosis, migration, spawning, horseshoe; STOP SEA LAMPREY!
Secret Code (page 7): Protect the lakes!

HAVE YOU EVER CONSIDERED...

...being an aquatic scientist? Science is fun and we love the work we do. One of the best parts about being an aquatic scientist is that we get to help solve some of the biggest problems facing the Great Lakes.

We make a big difference by protecting animals and plants, and helping people who live on and around the lakes. As aquatic scientists, we have fun interacting with wildlife, being outdoors, and exploring the natural wonders around us.

HOW CAN YOU HELP?

One of the best ways you can help in the battle against sea lampreys is telling other people about the damage sea lampreys do to Great Lakes fish. If you ever find a sea lamprey—or any other invasive species—in the wild, never move it to another place. And, finally, be sure to go outside and enjoy fishing, swimming, and playing at the beach on our Great Lakes!

People that have aquatic science careers hold many different jobs, including fishery and marine biologist, ecologist, park naturalist and manager, conservation officer, teacher, and many others! Ask your teachers how you can become an aquatic scientist, too!

For more information about sea lampreys, sea lamprey research and control, or the Great Lakes Fishery Commission and its partners, visit our website:

WWW.SEALAMPREY.ORG

GREAT LAKES FISHERY COMMISSION

PROTECTING OUR FISHERY

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