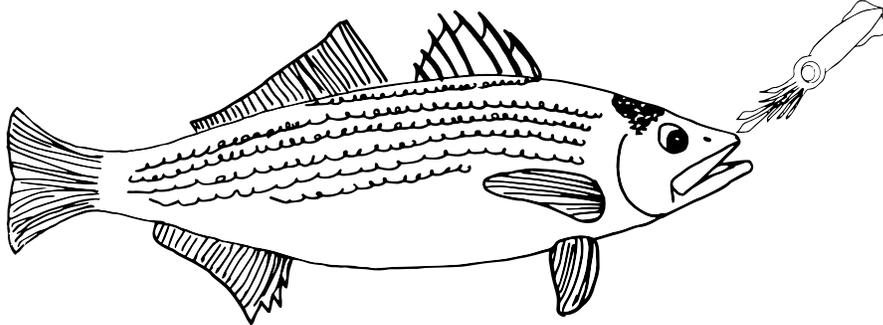


COLOR and Learn all about Fish!

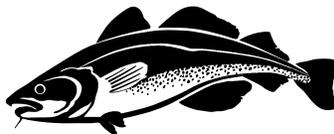
Get to know your Massachusetts saltwater sport fish!



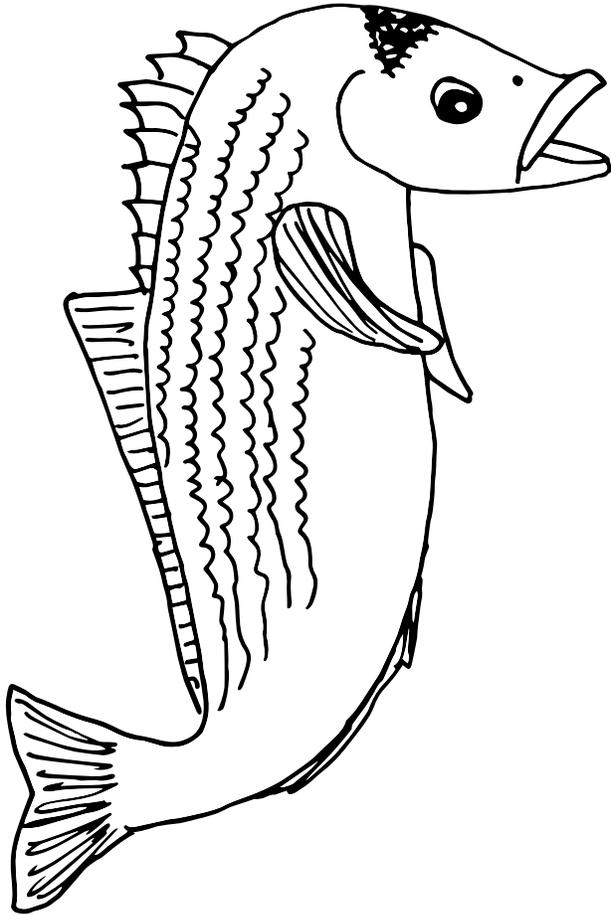
This book belongs to: _____



Marine Fisheries
Commonwealth of Massachusetts



What is a fish?



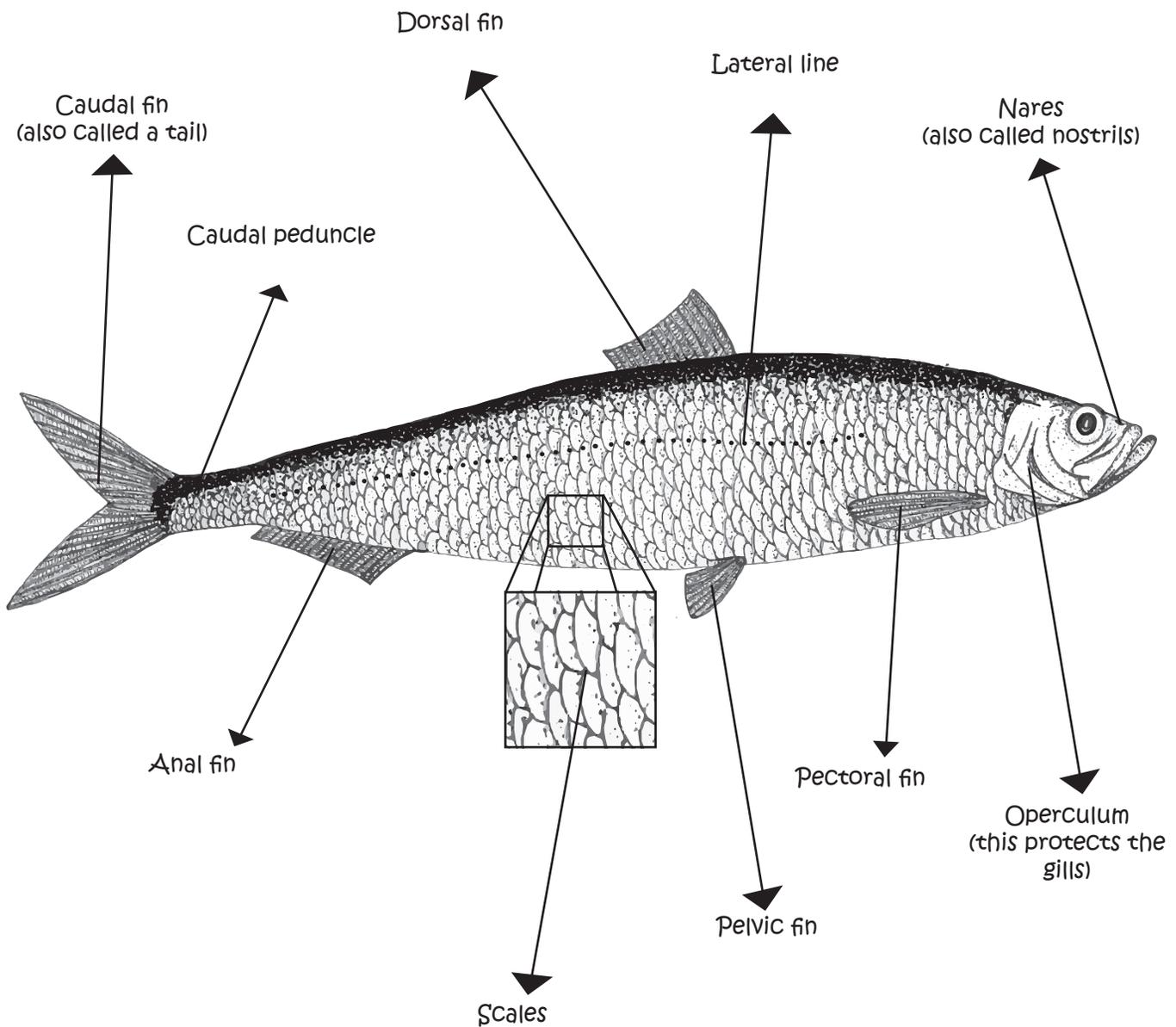
Fish are a kind of **animal**. They use gills to breathe, live in water, and have no digits (like fingers and toes) on their limbs! Most fish are cold-blooded, or **ectothermic** and rely on the water around them to keep them a good temperature. Some fish live in one area their entire lives while others migrate from one area to another.

There are over 32,000 **species** of fish ranging from living in high mountain lakes to the deepest spots in the ocean. Different fish can live in freshwater, saltwater, or **brackish** water. There are many fish that live along the Massachusetts coastline. Here, we'll learn about and meet some of the species that we like to fish for fun! These fish belong to the group 'bony fish.'



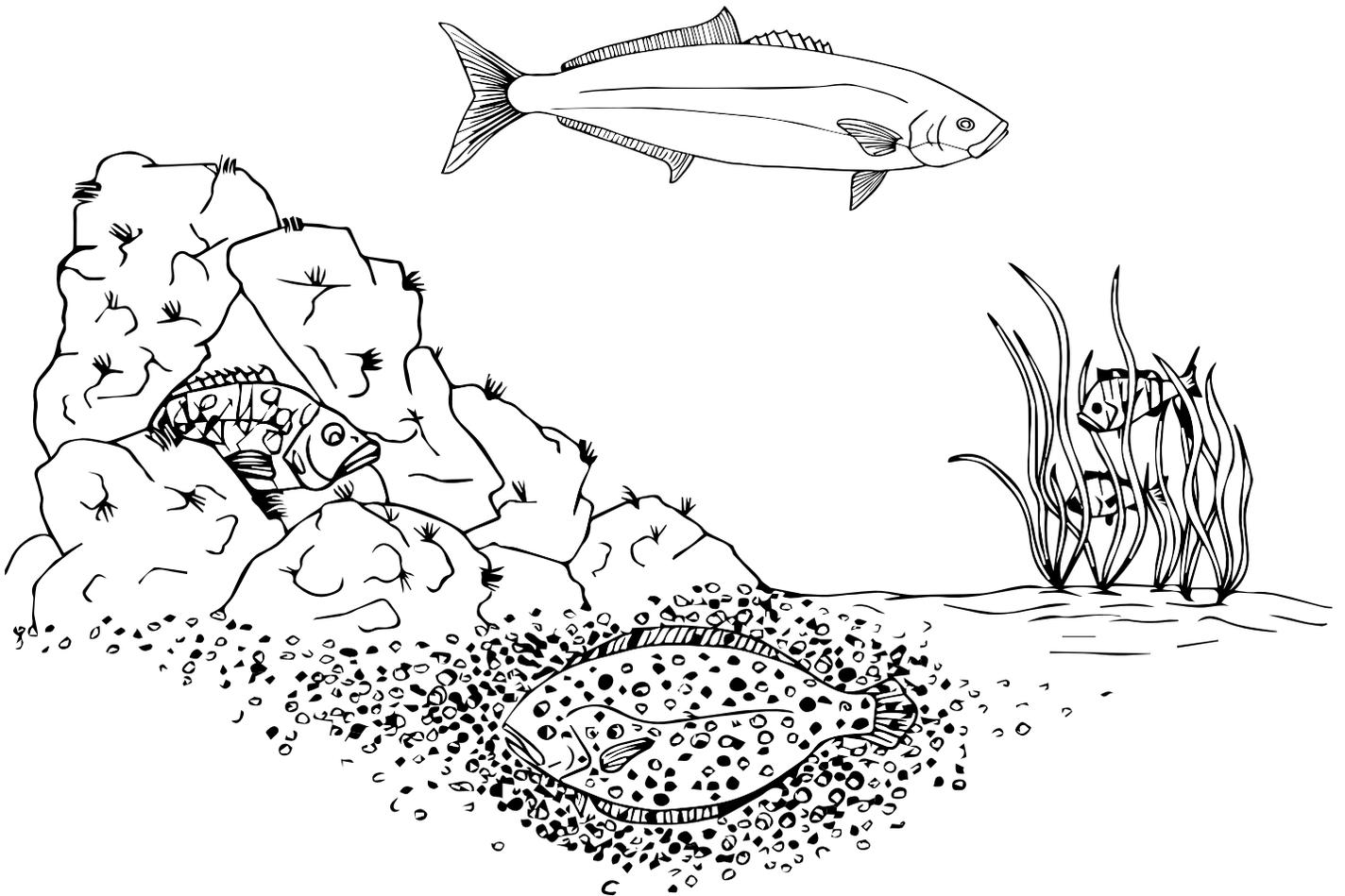
What are the parts of a fish?

Fish have many body parts just like you and me! Some of the body parts you will see on most fish, besides eyes and a mouth, are **scales**, **fins**, and **opercula** (plural for operculum)!



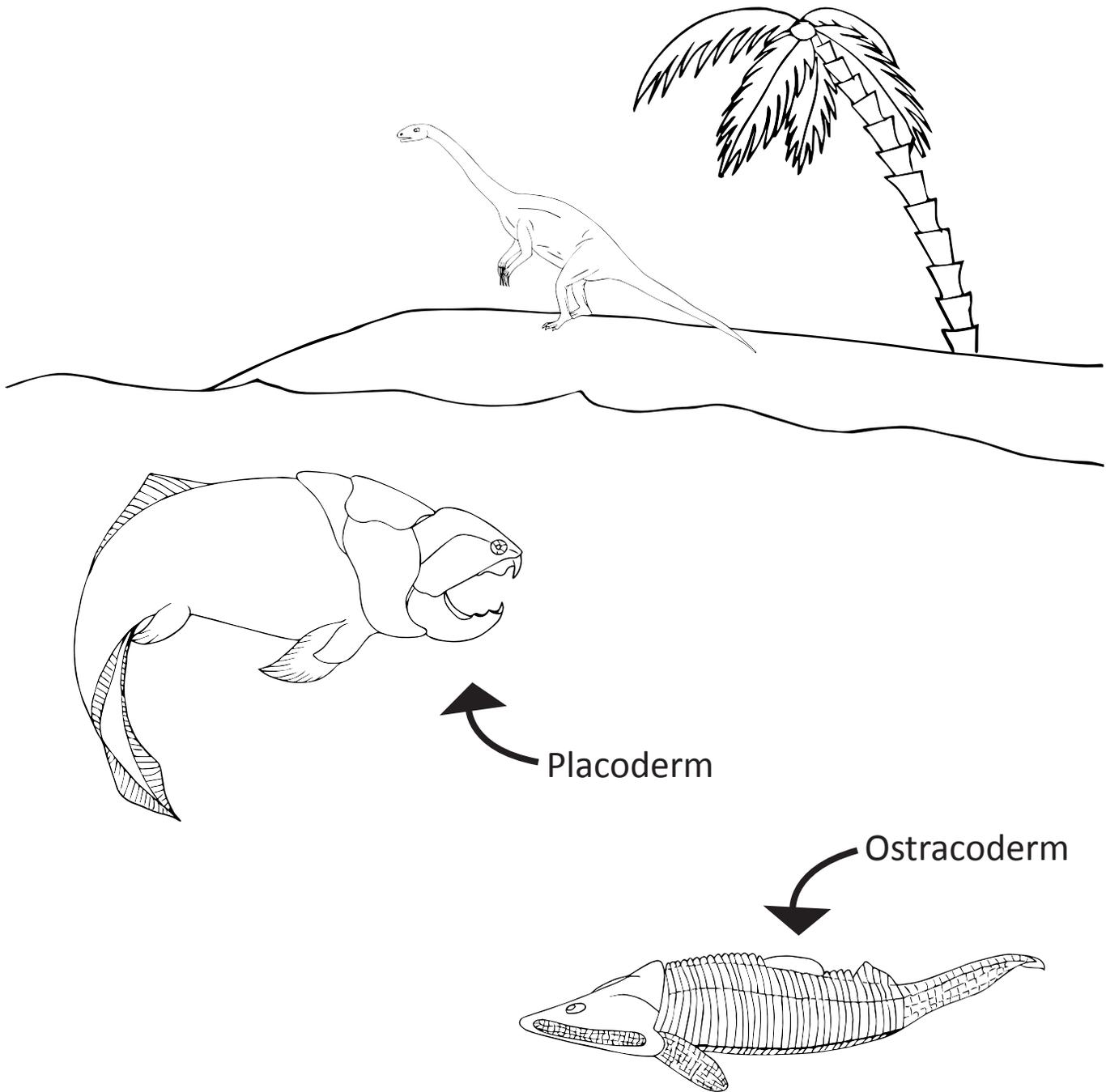
Where are the fish?

Each fish below has special colors and markings to help them hide. Can you see the different patterns on each fish that help them hide?



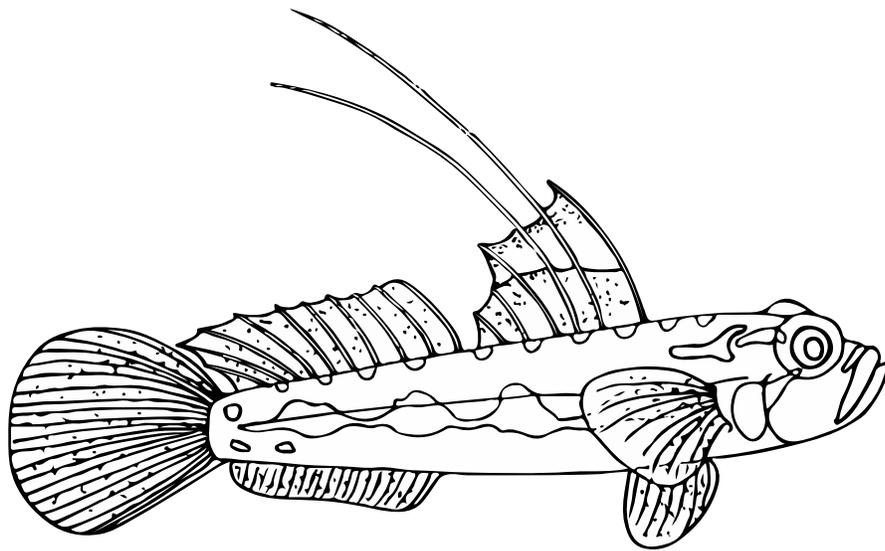
Although fish generally look the same, some have special shapes or markings that help them survive! Many fish have countershading. This is when fish are dark on the top and light on the belly. When seen from above, the fish looks like the dark waters below. When seen from below, the fish looks like the bright, sun lit waters above. This is a form of **camouflage**.

How long have fish existed?



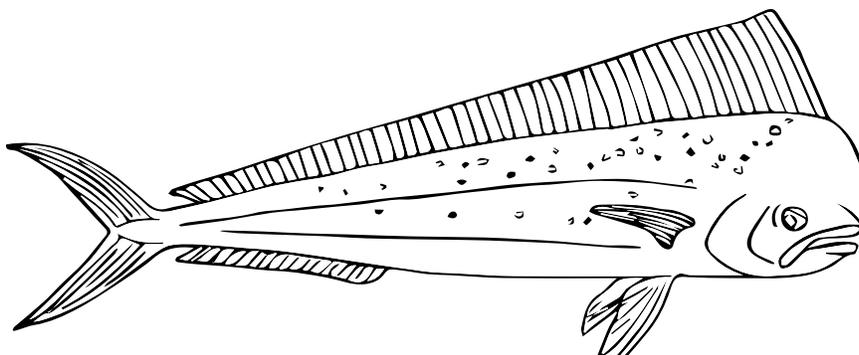
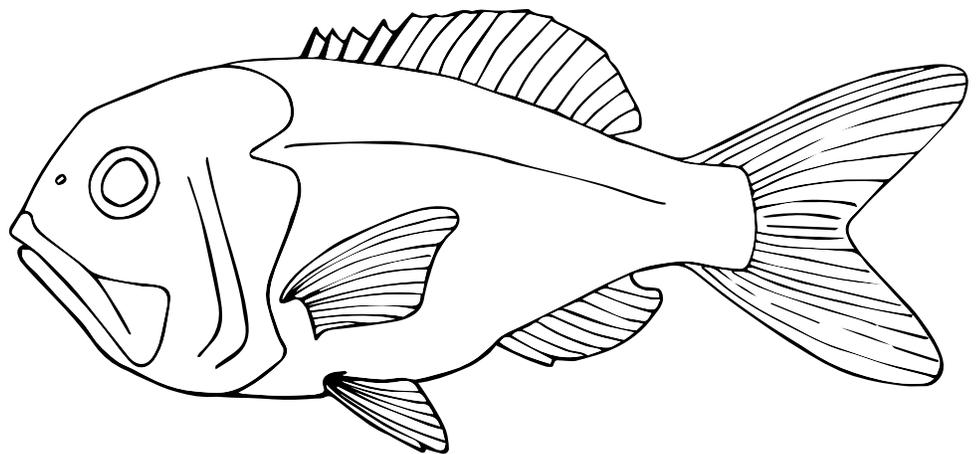
Fish are among the oldest **vertebrates** on Earth. **Jawless fish** called **ostracoderms** existed 510 million years ago! The first jawed fish called **placoderms** appeared 416 million years ago. Dinosaurs showed up around 230 million years ago and only lived until 65 million years ago. These early fishes outlived the dinosaurs and were around until 2.5 million years ago!

How old do fish get?



Pygmy goby

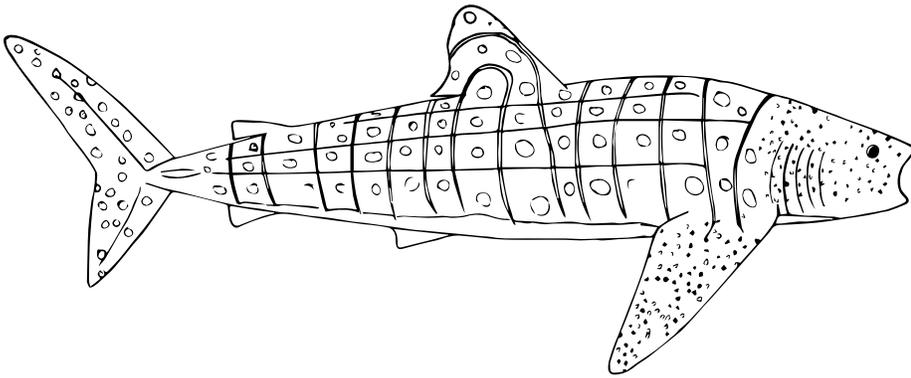
Orange roughy



Mahi mahi

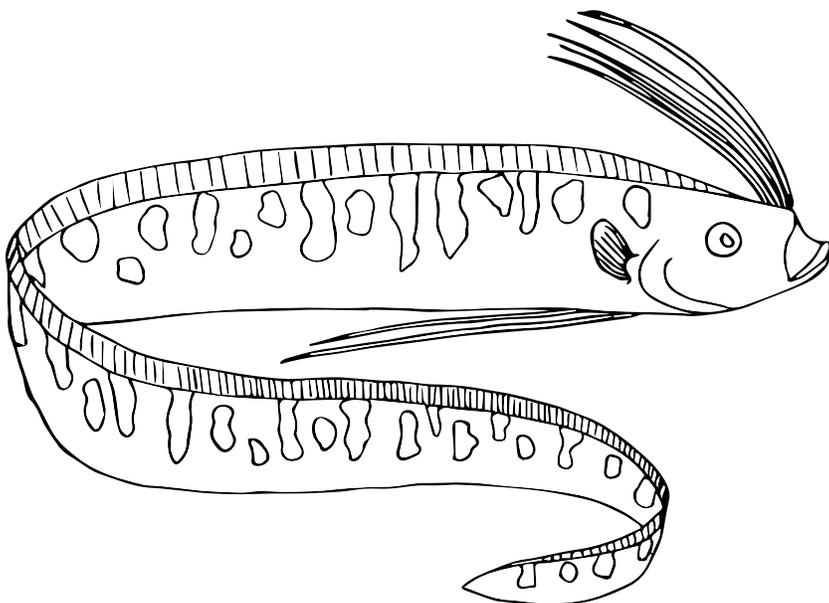
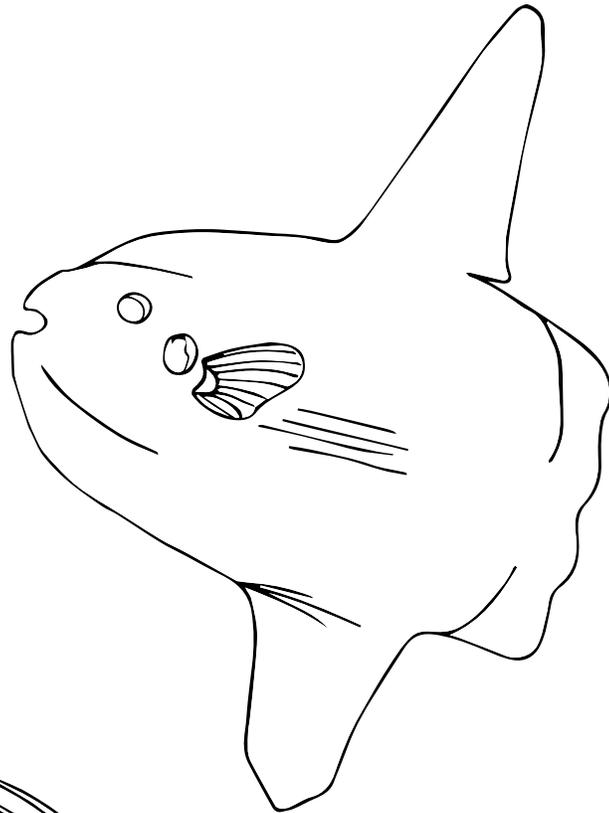
Fish range in life spans. The youngest living fish, the **Pygmy Goby**, lives only to 59 days! **Mahi mahi**—common dolphinfish—live to only 4 or 5 years, while orange roughy has been known to live for 150 years. Some koi have been reported to live over 200 years!

How big do fish get?



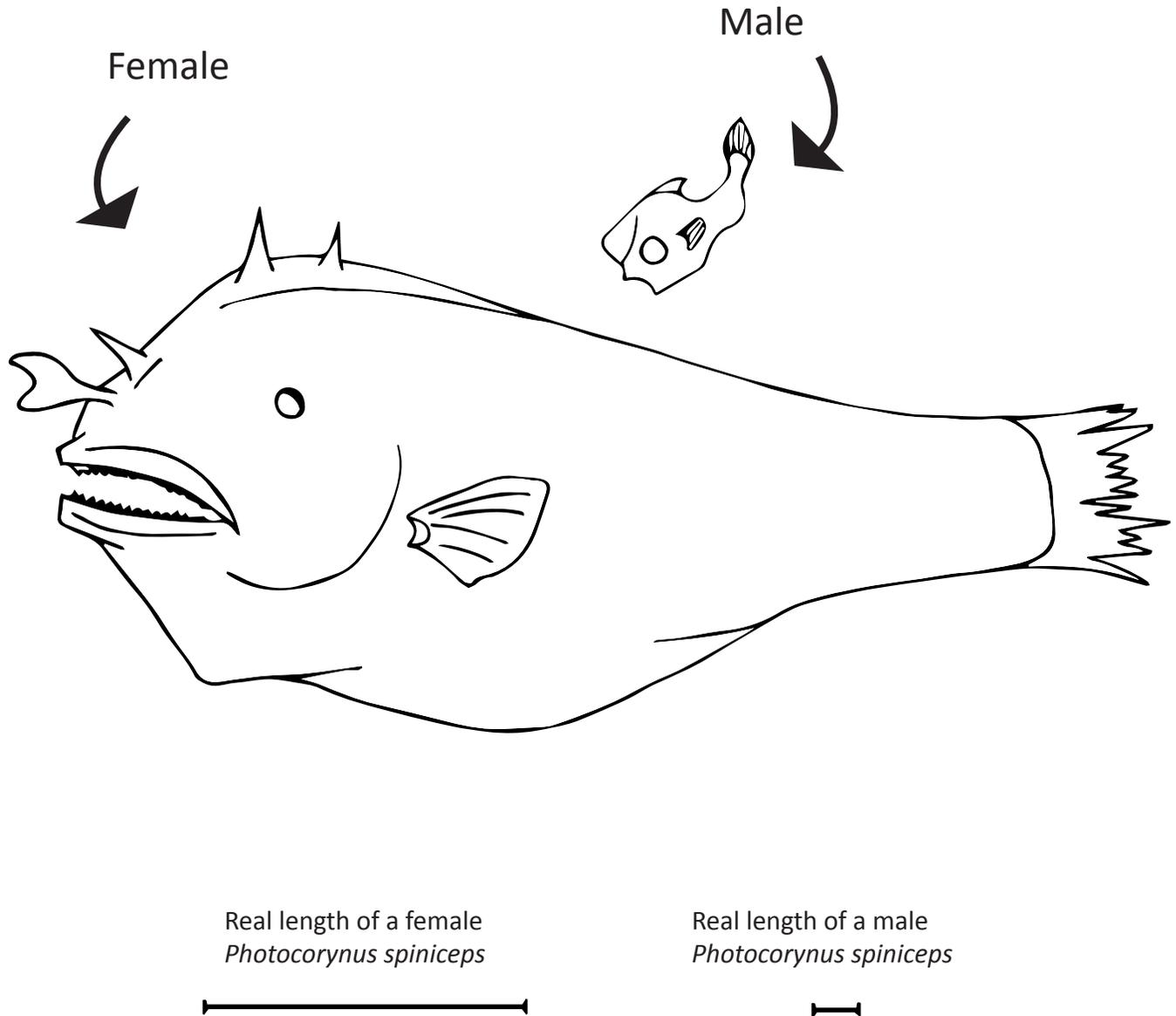
The largest fish of any kind is the whale shark. Whale sharks can grow to 50 feet long and weigh over 47,000 pounds!

The largest bony fish is the ocean sunfish. Ocean sunfish can grow to 11 feet long and weigh over 5,000 pounds! They are easily recognized by their odd body shape.



The **giant oarfish** is the longest bony fish in the world. It is a very thin and long fish that can be over 55 feet long and weigh over 650 pounds!

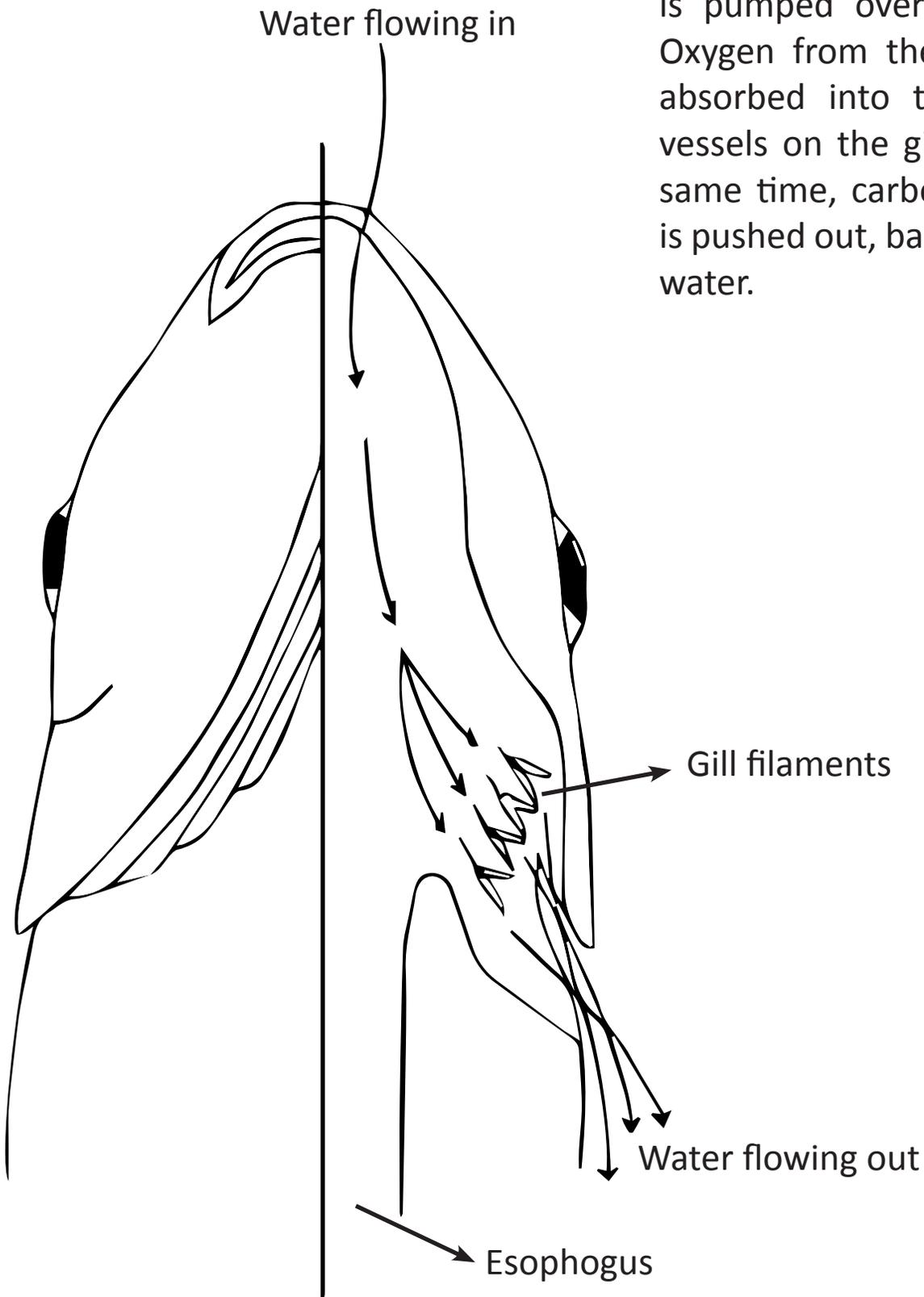
What is the smallest fish?



There are many small fish, but the male anglerfish in the species *Photocorynus spiniceps* is the smallest known fish when fully grown. It is only 0.25-0.3 inches when an adult! The females, on the other hand, grow much bigger—to almost 2 inches! These and some other angler species live in deep water—over 4,000 feet deep!

How do fish breathe?

Instead of lungs, most fish use **gills** to breathe. Water is pumped over the gills. Oxygen from the water is absorbed into thin blood vessels on the gills. At the same time, carbon dioxide is pushed out, back into the water.



Do fish sleep?

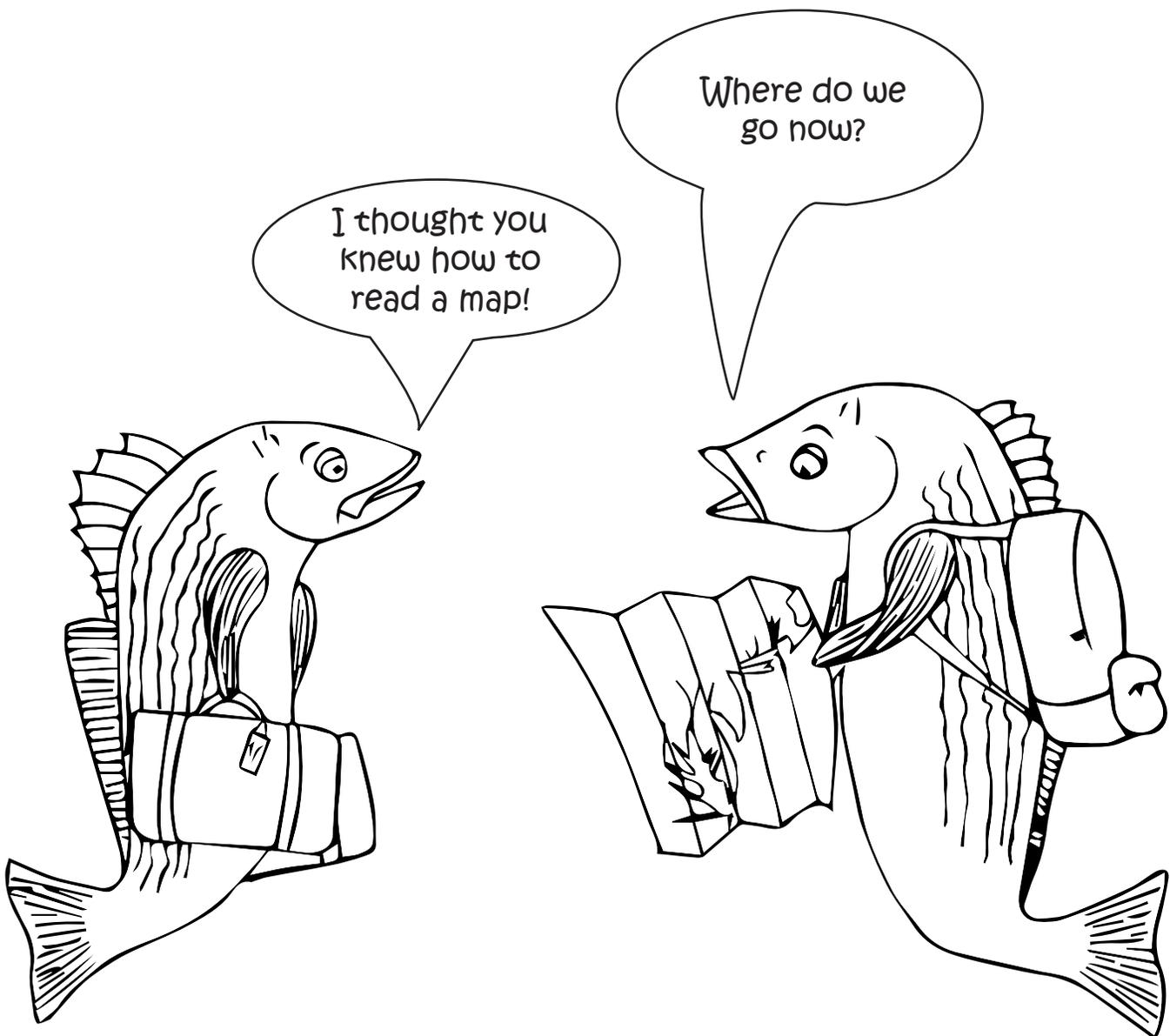
All fish rest, but fish don't close their eyes and go to sleep like we do, they don't have any eyelids! Many fish find a place to hide so they can relax! Some fish find a hole to settle down and hide in to rest. Other fish relax and hide by burying themselves in the ground. Fish that swim constantly rest by daydreaming as they swim along. Fish are never fully asleep because they need to make sure they stay safe from predators!

Sand lance relax by burying themselves in the sand at night.



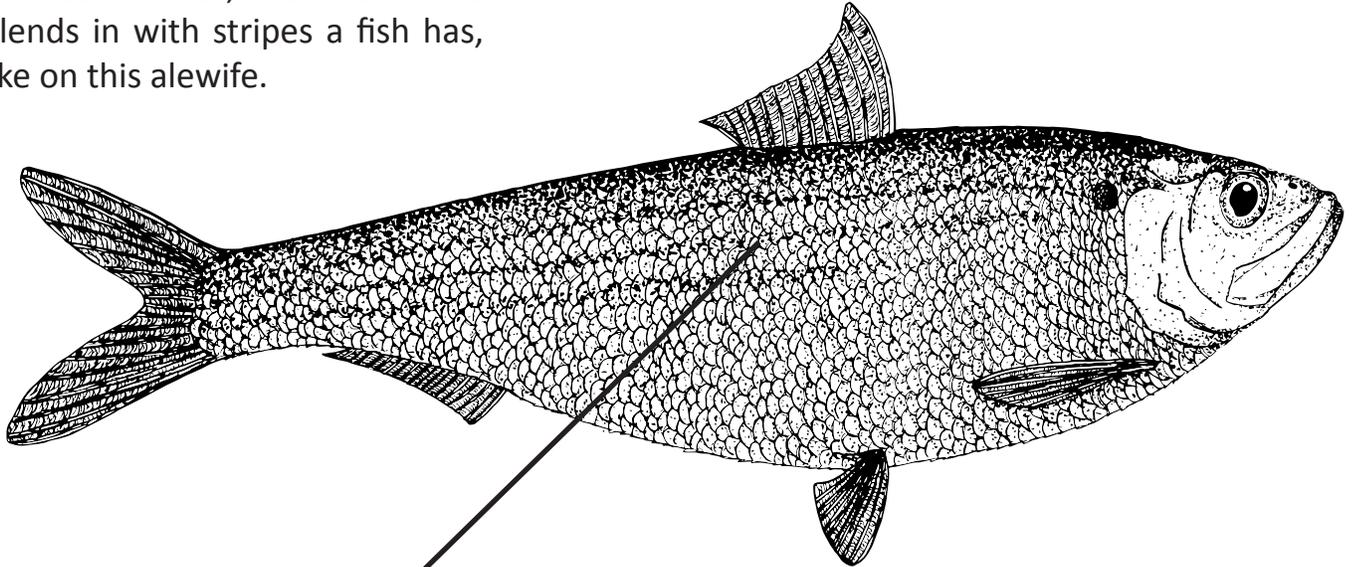
Where do fish go in the winter?

While some fish remain in the same place throughout their lives, others **migrate** to different areas. Some fish, like striped bass, move to freshwater to breed. Other fish, like bluefish, live off the coast of more southern states—South Carolina to Florida—in the winter and move north to Massachusetts in the summer. Some fish, like tuna, can travel across the Atlantic to Europe and back!



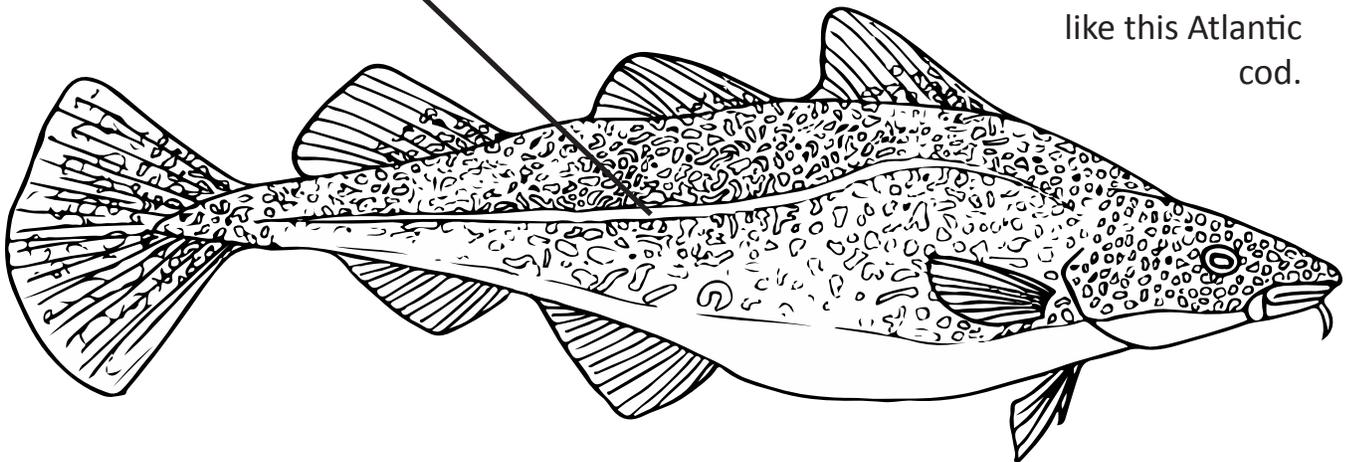
What is a lateral line?

The lateral line can be seen as a distinct line on both sides of most fish. Sometimes, the lateral line blends in with stripes a fish has, like on this alewife.



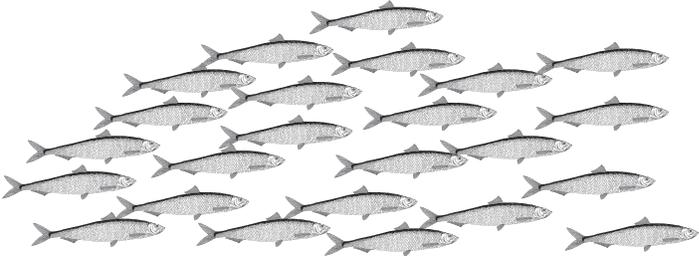
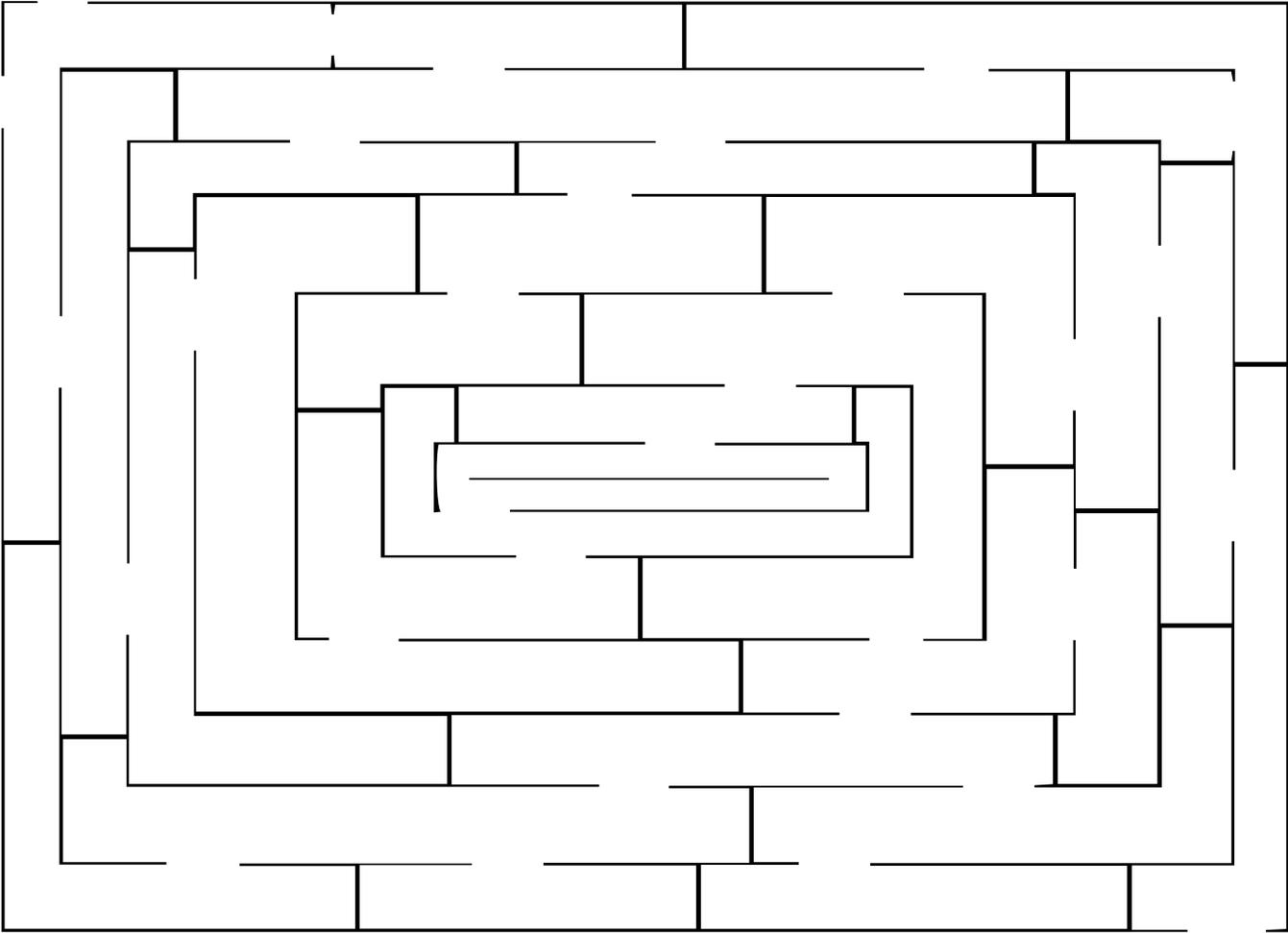
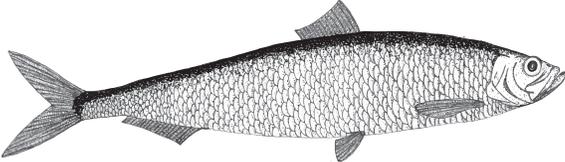
Lateral line

It's hard to miss the lateral line on fish like this Atlantic cod.



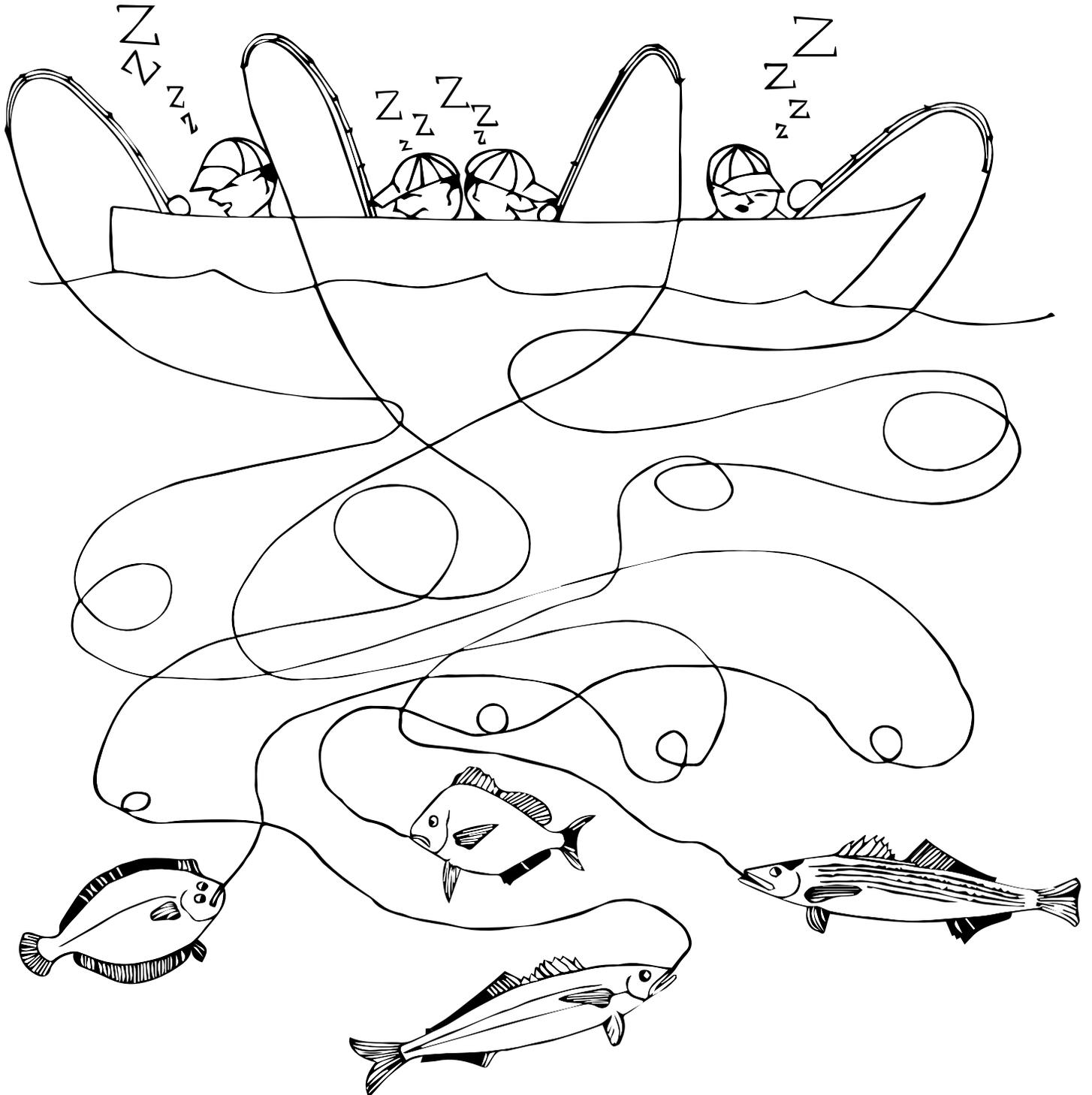
Many **pelagic** fish school, or move together, in large groups. They can swim very close and move in the same direction because of their **lateral lines**. A lateral line is a line of pores on both sides of the fish that senses pressure changes (movement) in the water. This lets the fish feel when others are moving before seeing them move! Lateral lines also help fish 'feel' when a predator or prey is around!

Help the Atlantic herring find its way back to the school!



Who has which fish?

All of the anglers on this boat fell asleep! Help them untangle their lines and see who caught which fish!



Can you find all of the hidden fish names?

Look up, down, diagonally, and backwards!

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

Atlantic Cod

Black Sea Bass

Cunner

Sculpin

Striped Bass

Tautog

Atlantic Mackerel

Bluefish

Pollock

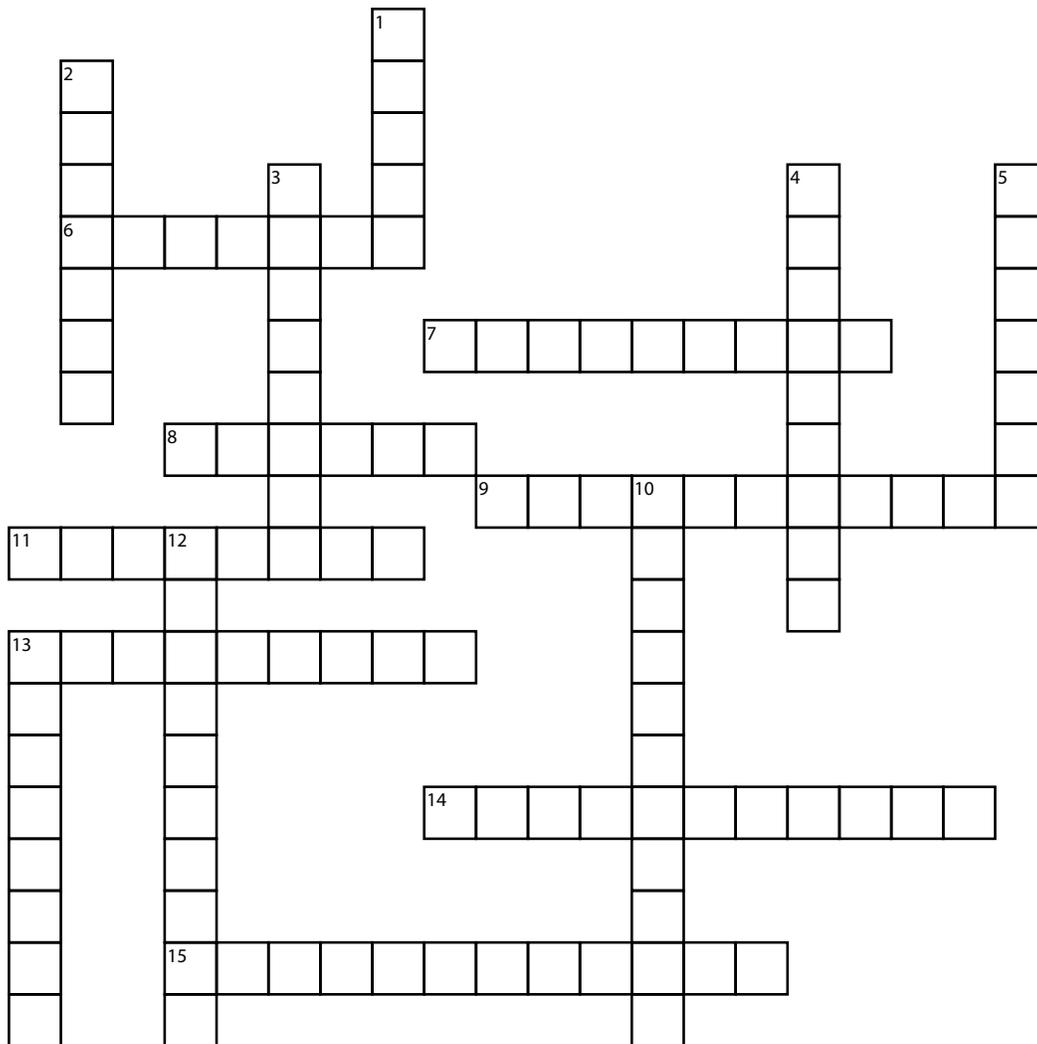
Scup

Summer Flounder

Winter Flounder

Use the clues to fill out the crossword!

For extra help, look for the **bold** words throughout this book!



Across

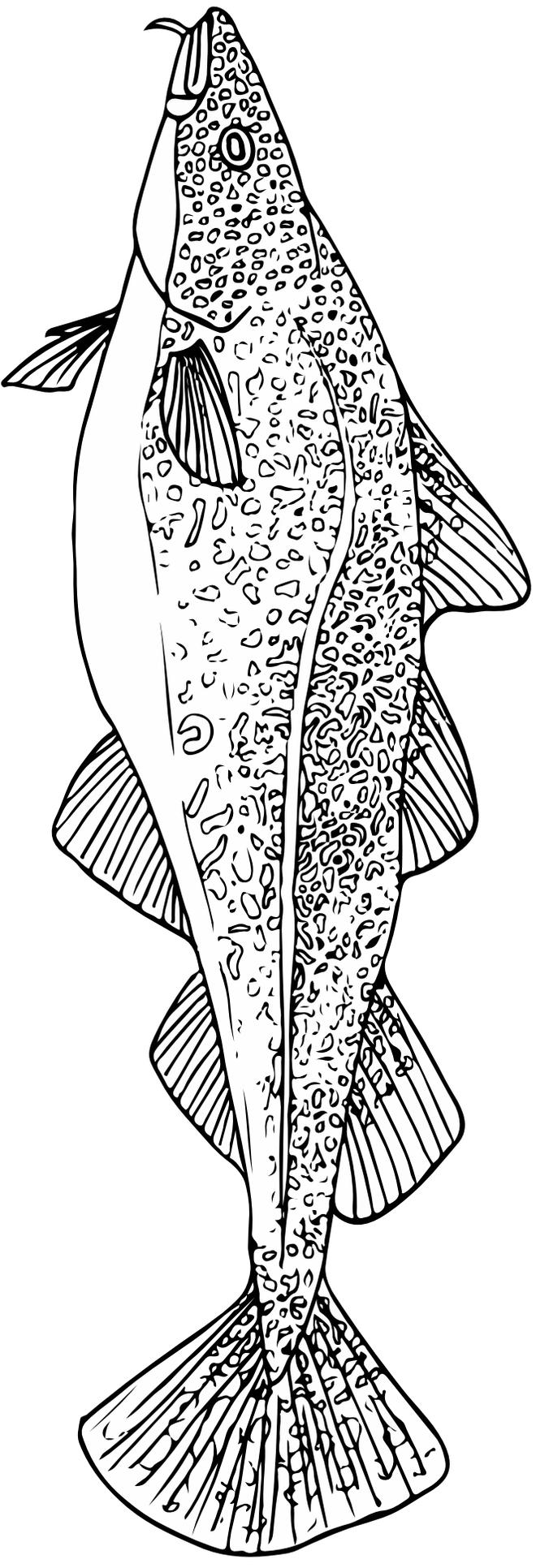
- 6 Examples: fish, humans, turtles, whales, birds
- 7 The first jawed fish
- 8 Helps protect most fish from predators and disease
- 9 This part of a fish senses water pressure differences
- 11 Freshwater + saltwater = _____ water
- 13 The shortest lived fish
- 14 Fish without jaws
- 15 Longest fish in the world

Down

- 1 We have lungs while fish have _____
- 2 Living in the open ocean
- 3 Common dolphinfish
- 4 Bony gill covering
- 5 Moving, sometimes far distances
- 10 Relying on the environment to control body temperature
- 12 Hiding among your surroundings
- 13 Another name for hunter

Atlantic Cod

Gadus morhua



Massachusetts State Record: 92 pounds

Size: Typically 2 feet long, 10 pounds; can be 4 feet and 60 pounds!

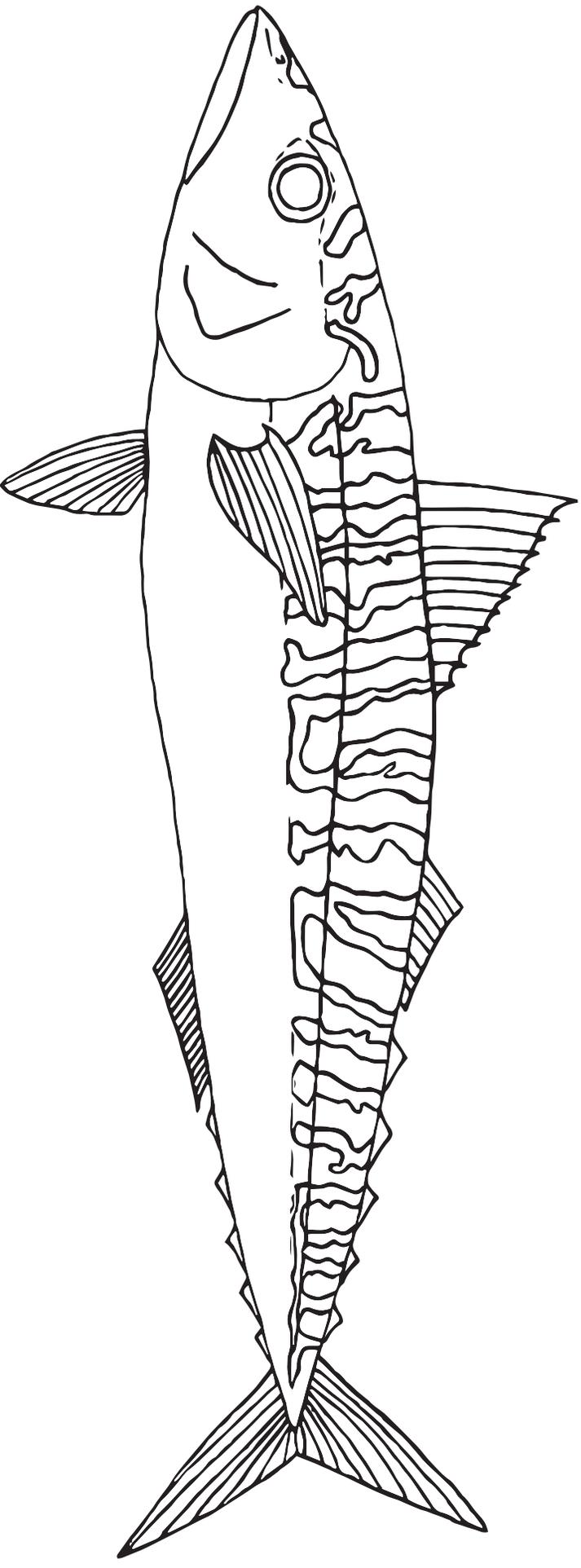
Color: Anywhere from yellowish to greenish to brownish with lots of brown spots, white or yellow belly

Habitat: Near irregular hard bottom, 36-120 feet or deeper

Range: Northern Canada to Cape Hatteras, North Carolina

Atlantic Mackerel

Scomber scombrus



Massachusetts State Record: 3 pounds, 8 ounces

Size: Up to 22 inches long

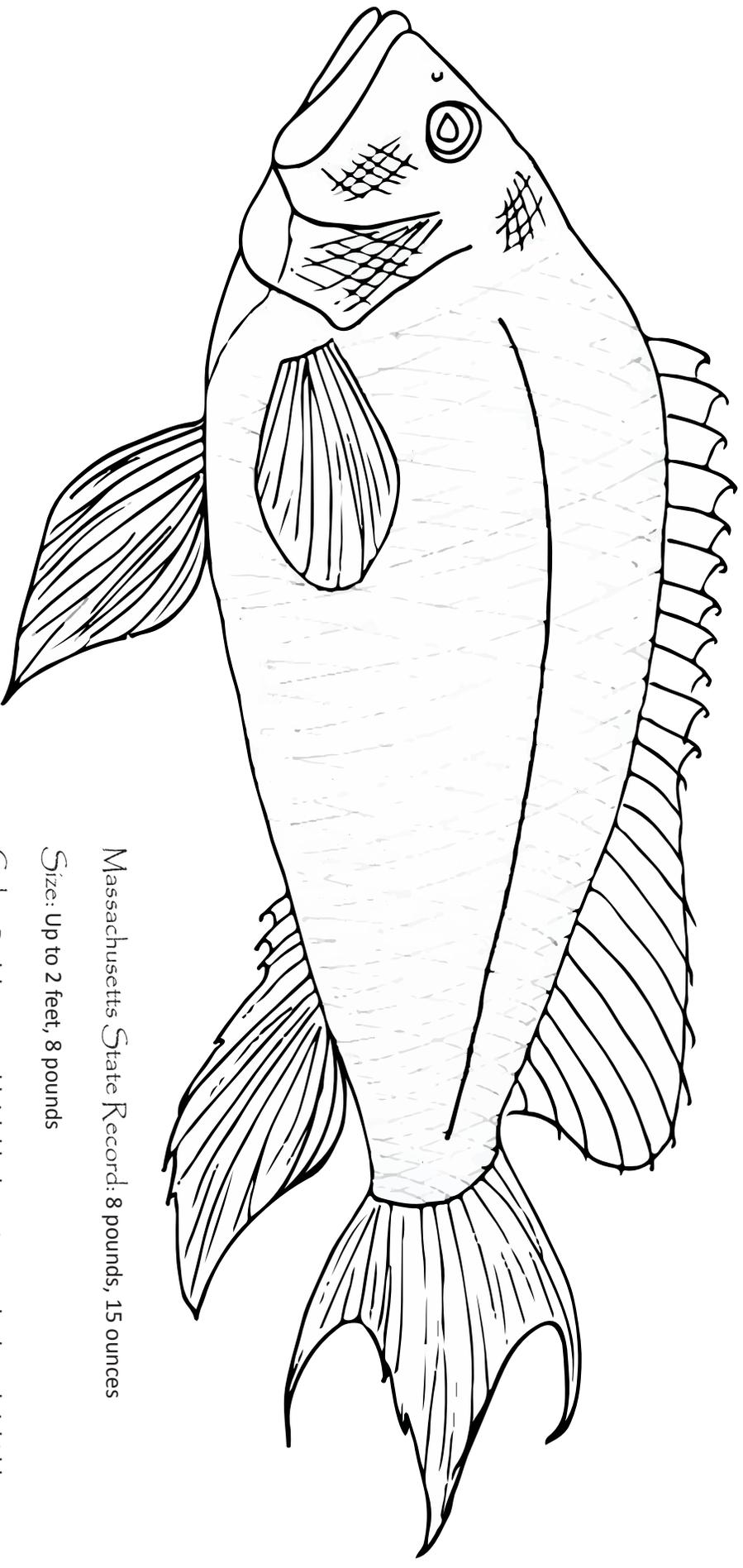
Color: Dark bluish green on top with dark, wavy bands from the back to just below the lateral line, white on the belly

Habitat: Open water

Range: Newfoundland, Canada to Cape Hatteras, North Carolina

Black Sea Bass

Centropristis striata



Massachusetts State Record: 8 pounds, 15 ounces

Size: Up to 2 feet, 8 pounds

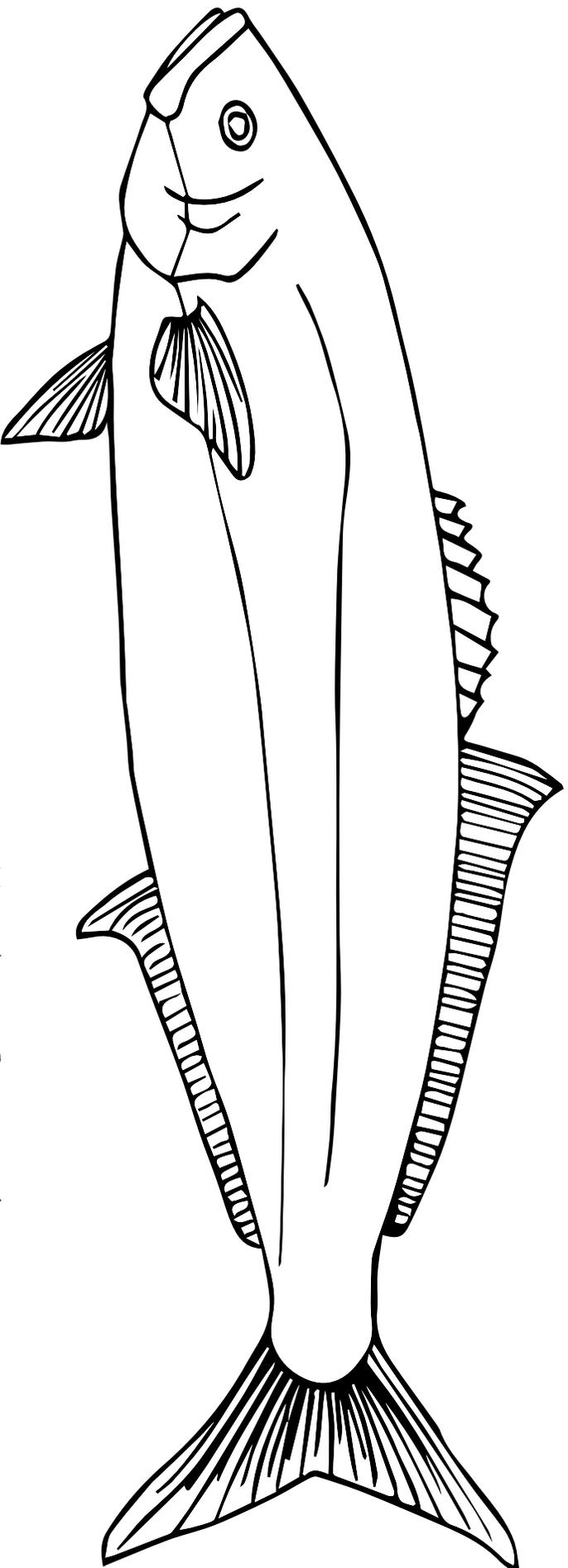
Color: Dark brown or bluish black; mature males have bright blue on their heads

Habitat: Shallow continental shelf water, over and in structure

Range: Maine to Florida and Gulf of Mexico

Bluefish

Pomatomus saltatrix



Massachusetts State Record: 27 pounds, 4 ounces

Size: Up to 4 feet, 32 pounds

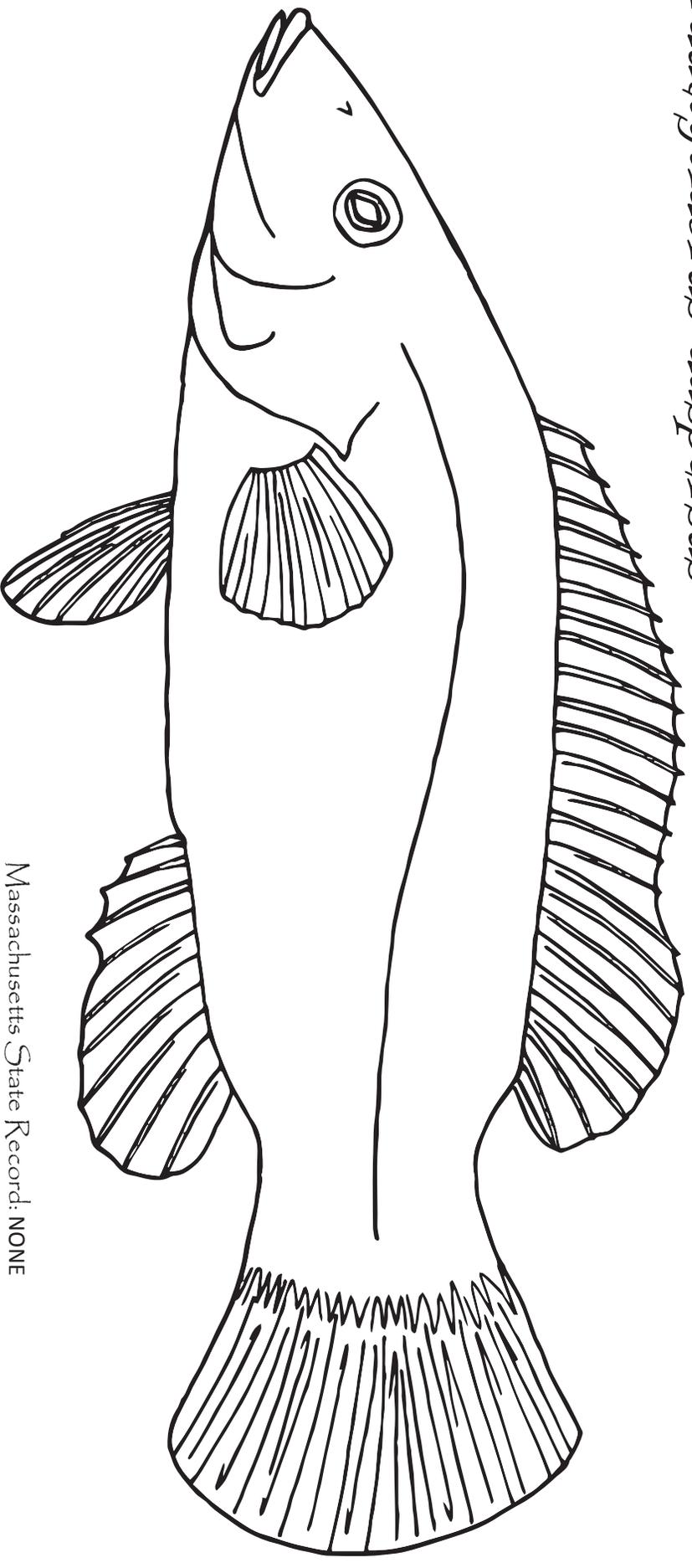
Color: Metallic blue, sometimes greenish or grayish blue on top, white on the belly

Habitat: Near and offshore, surface

Range: Nova Scotia, Canada to South Carolina

Cunner

Tautoglabrus adspersus



Massachusetts State Record: NONE

Size: Up to 15 inches, more commonly up to 10 inches; 2 pounds

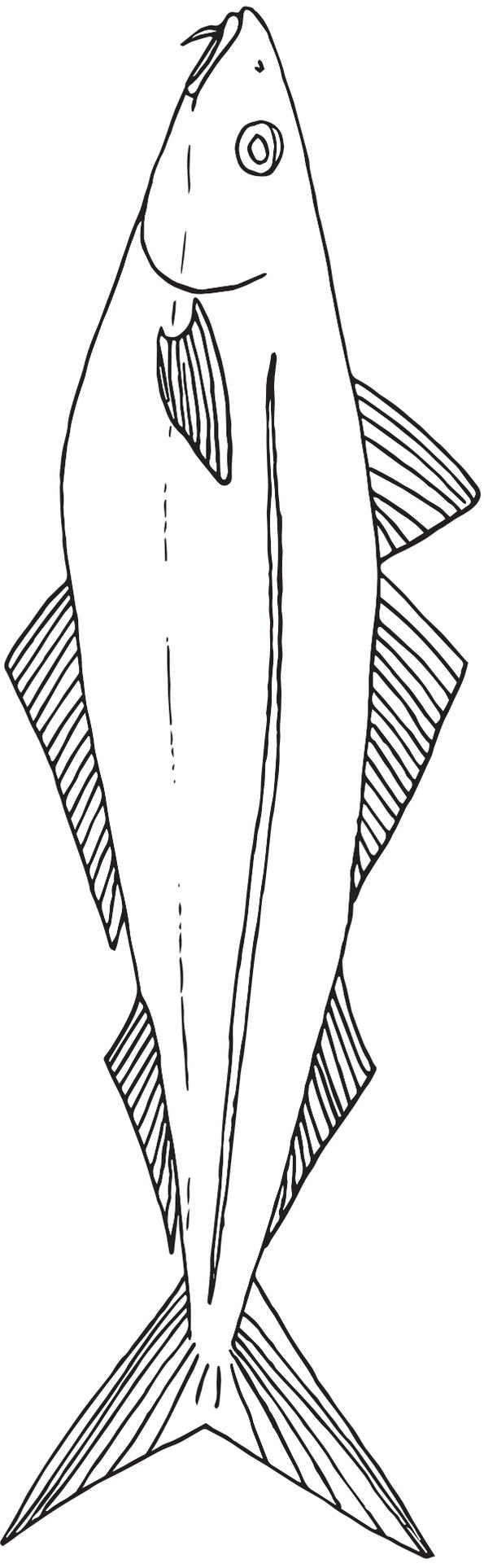
Color: Reddish brown above with bluish mottle throughout, can change coloration with surroundings, can form dark brown bands

Habitat: Shallow coastal waters around structure or eelgrass

Range: Newfoundland to New Jersey, sometimes in Chesapeake Bay

Pollock

Pollachius virens



Massachusetts State Record: 22 pounds, 8 ounces

Size: Up to 47 inches and 71 pounds; typically less than 43 inches

Color: Brownish green to gray above fading on side to silver on belly, lateral line is bright white

Habitat: Above substrate to roughly 600 feet deep, occasionally seen at surface

Range: Southwestern Greenland to New Jersey, sometimes south to North Carolina

Scup

Stenotomus chrysops

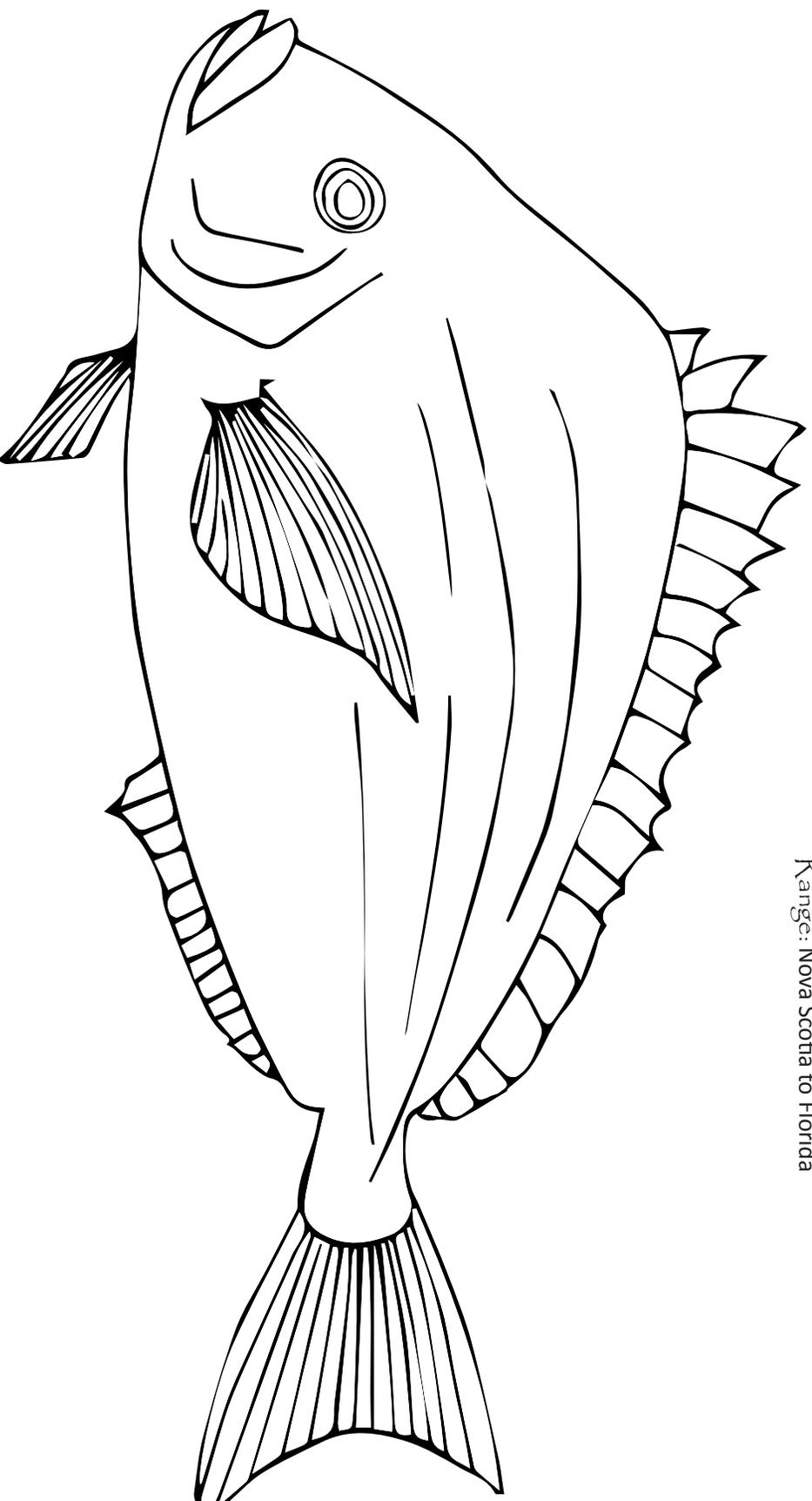
Massachusetts State Record: 3 pounds, 13 ounces

Size: Up to 18 inches, 4 pounds 8 ounces; usually 10 inches

Color: Silver throughout with variations of pink, blue, and green mottled above

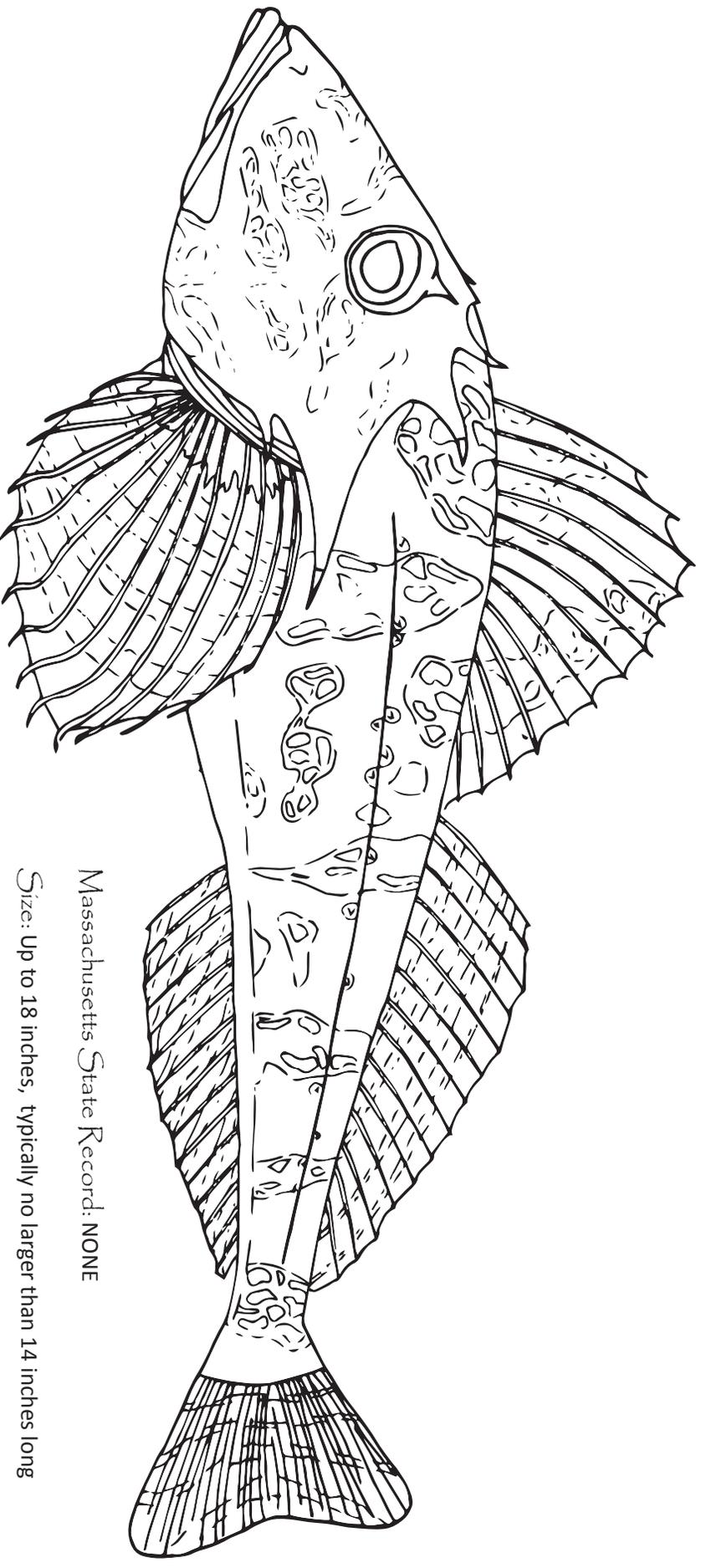
Habitat: Shallow waters over structure

Range: Nova Scotia to Florida



Longhorn Sculpin

Myoxocephalus octodecemspinosus



Massachusetts State Record: NONE

Size: Up to 18 inches, typically no larger than 14 inches long

Color: Dark green-brown above fading on sides to white on belly, usually tan to dark brown bands on the sides

Habitat: Ocean bottom in shallow waters and harbors, moving deeper in winter down to 400 feet deep

Range: Newfoundland to Virginia

Summer Flounder

Paralichthys dentatus

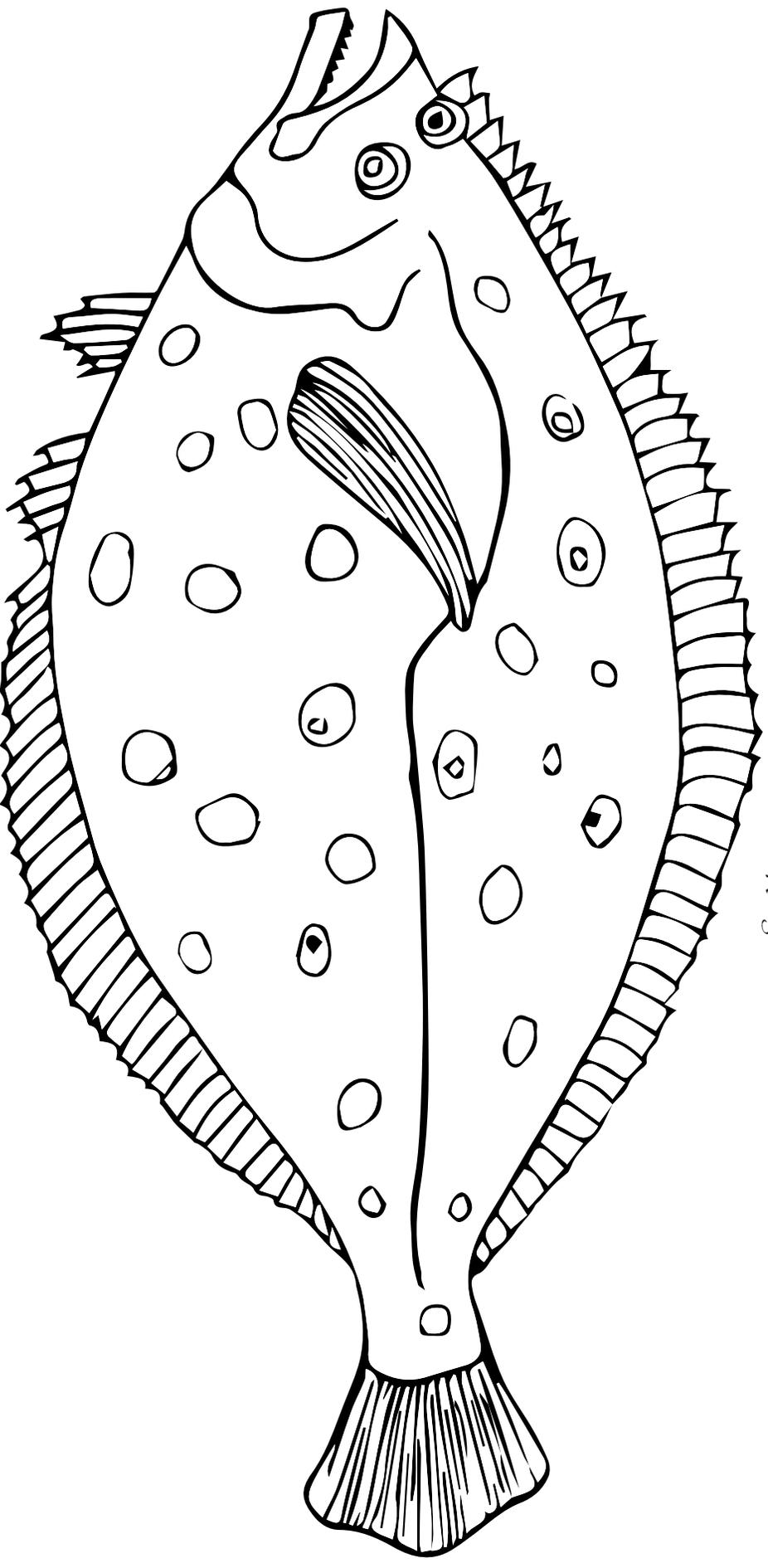
Massachusetts State Record: 21 pounds, 8 ounces

Size: Up to 36 inches and 26 pounds, 7 ounces

Color: Eyed side is light to dark brown with light mottling and spots, white on the belly; can darken or lighten color depending on substrate

Habitat: Shallow water over mud or sand

Range: Gulf of Maine to southeast Florida



Striped Bass

Morone saxatilis



Massachusetts State Record: 73 pounds

Size: Up to 72 inches, 125 pounds; usually up to 50 inches

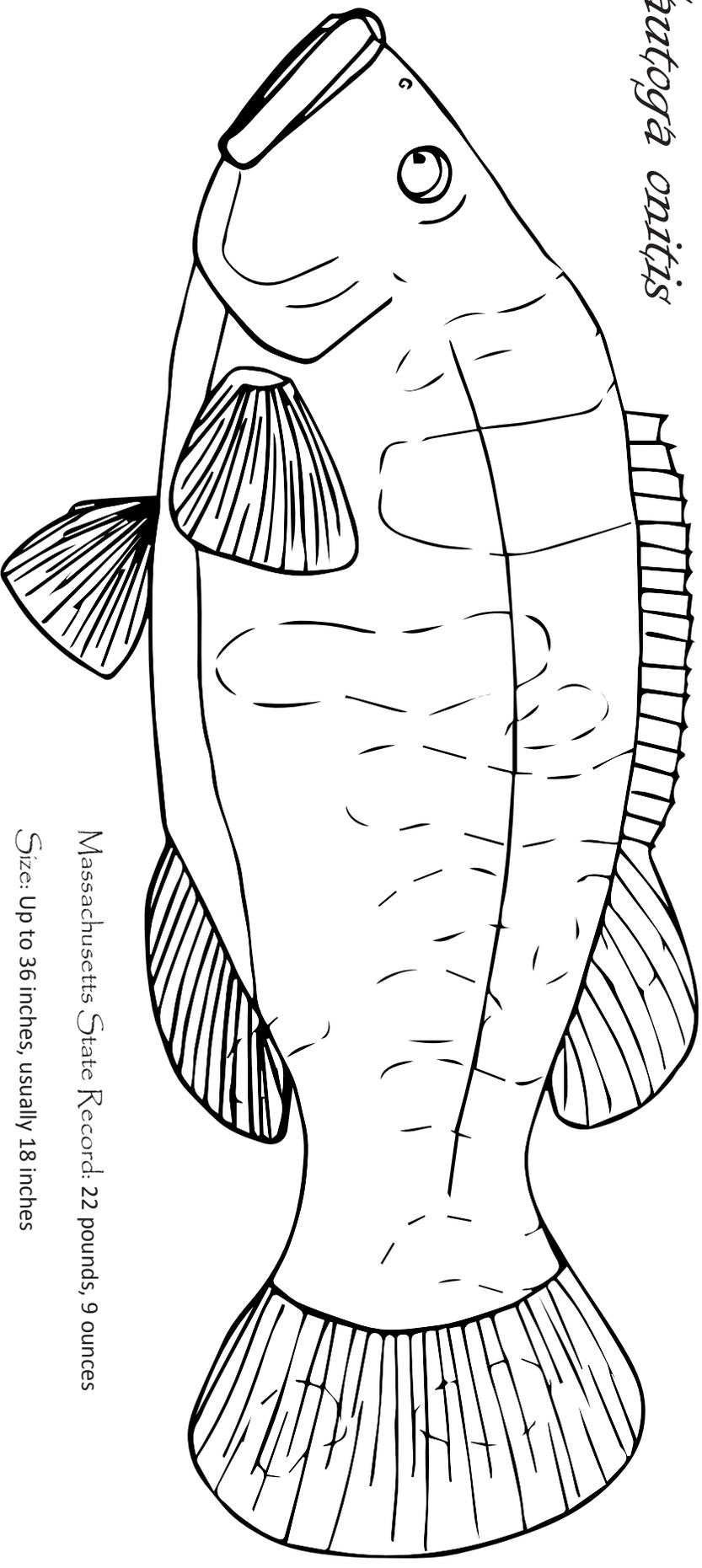
Color: Dark brown-green to dark blue on top, silver on sides with 6 to 9 black stripes from head to tail, silver white on the belly

Habitat: Inshore areas over various substrate

Range: New Brunswick Canada to Sebastian, Florida, and northern Gulf of Mexico; some individuals stay in fresh or brackish water

Tautog

Tautoga onitis



Massachusetts State Record: 22 pounds, 9 ounces

Size: Up to 36 inches, usually 18 inches

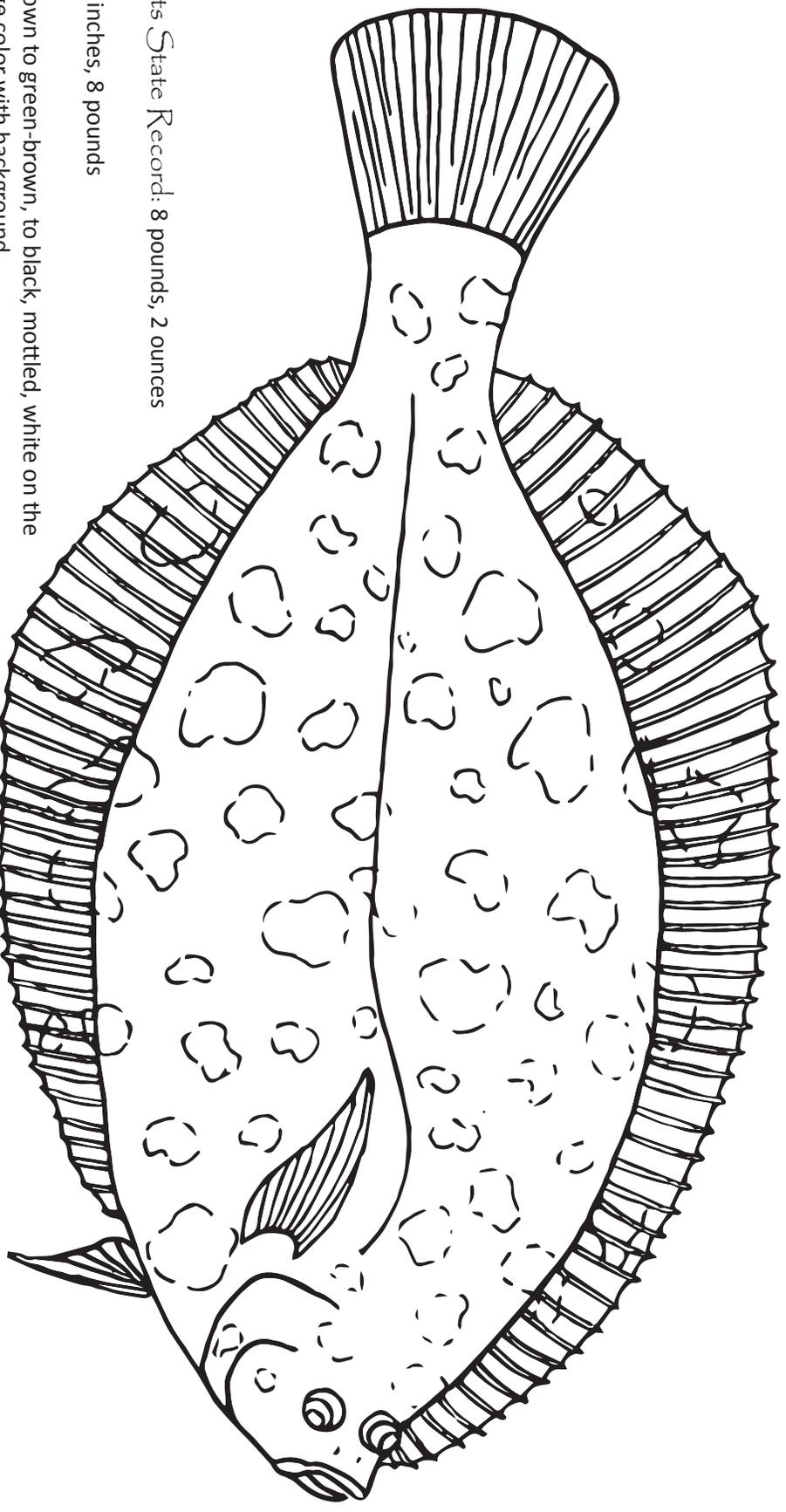
Color: Brown-gray to dark green-brown, gray-black, mottled, white chin in older individuals; can change color with background

Habitat: Inshore to 60 feet, near built up substrate like rocks, piers, docks, wreck, and mussel beds

Range: Nova Scotia to South Carolina

Winter Flounder

Pseudopleuronectes americanus



Massachusetts State Record: 8 pounds, 2 ounces

Size: Up to 25 inches, 8 pounds

Color: Red-brown to green-brown, to black, mottled, white on the belly; can change color with background

Habitat: Over mud or sand to 120 feet, sometimes in grass or seaweed

Range: Labrador to Georgia

Draw your own fish!

Use your imagination to think up your very own species of fish! Don't forget to add fins, gills, and a tail!

Cut out your own Jr. Angler Permit!

With a parent's help and/or permission, cut out your very own permit.
Don't forget to sign your name! Carry your Jr. Angler permit every time you
go fishing!

	20__	Marine Fisheries Commonwealth of Massachusetts
Junior Recreational Saltwater Fishing Permit		
Angler ID: #1 Angler!	Expires: 12/31/20__ or your 16th birthday, whichever comes first!	
Name: _____		
Signature: _____		

(cut along the dotted line)

For more information, visit our website!
<http://www.mass.gov/marinefisheries>

All content including information, games, and images, are the creation of Elaine Brewer for the Massachusetts Division of Marine Fisheries. She can be reached at: elaine.brewer@state.ma.us

Massachusetts Division of Marine Fisheries
251 Causeway Street, Suite 400
Boston, Massachusetts 02114

Marine Fisheries
Commonwealth of Massachusetts

