

HUDSON RIVER ESTUARY ESSENTIALS



The river's gentle slope allows the Atlantic Ocean tides to reach more than 150 miles upriver to the city of Troy, a few miles north of the state capital, Albany. Along with these tides comes salt water, which mixes with fresh water from streams and rainfall. A place where these waters mix is called an ESTUARY.

The river was named after Henry Hudson, who explored the river in 1609 thinking he had found a shortcut to the riches of Asia.

Had he? Of course not. But before long the Hudson became a watery highway busy with ocean-bound commerce. Over the centuries many

YOU JUST WENT SAILING IN A TIME MACHINE...

You sailed in the last of the great Hudson River sloops, once common in the 1800s, upon a legendary river rich in beauty, biodiversity, and culture.



The Hudson River has been treasured by people for thousands of years. The Algonquian native Americans had many names for it, including Muheakantuck, or "the river that flows two ways." Aboard the sloop *Clearwater* you learned why the Hudson flows both upstream and down. *Can you explain it to someone you know?*

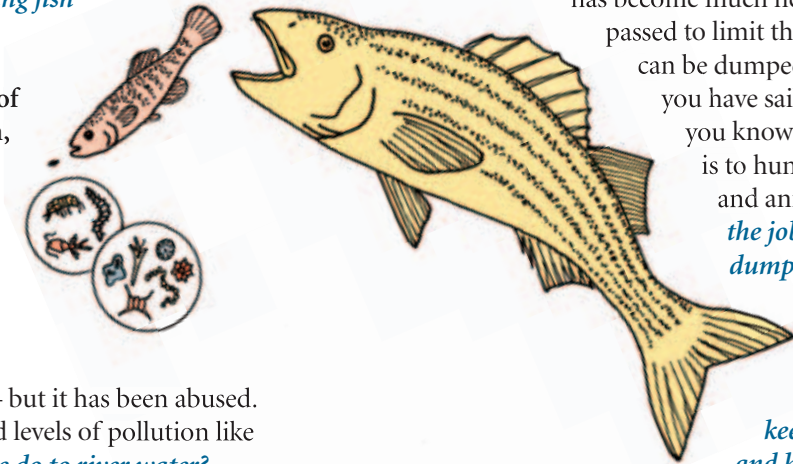
types of watercraft came and went along the river. *Can you name any of them? Did you see any when you were on the river?*

Many cultures have praised the diversity of aquatic life in the Hudson River estuary. The river provides a sheltered environment for many

ocean species to migrate and lay their eggs. *What are some of the areas that provide shelter for young fish and crustaceans?*

The Hudson's waters are home to hundreds of species of tiny invertebrates, phyto-plankton, and lots of beneficial algae. These tiny creatures form the base of a complex food web that supports bald eagles, ducks, turtles, otters — and even humans. *Can you name the largest fish in the Hudson River? How big does it get?*

The Hudson River estuary is a special place — but it has been abused. As towns and cities grew along the river, so did levels of pollution like sewage and toxic chemicals. *What does sewage do to river water?*

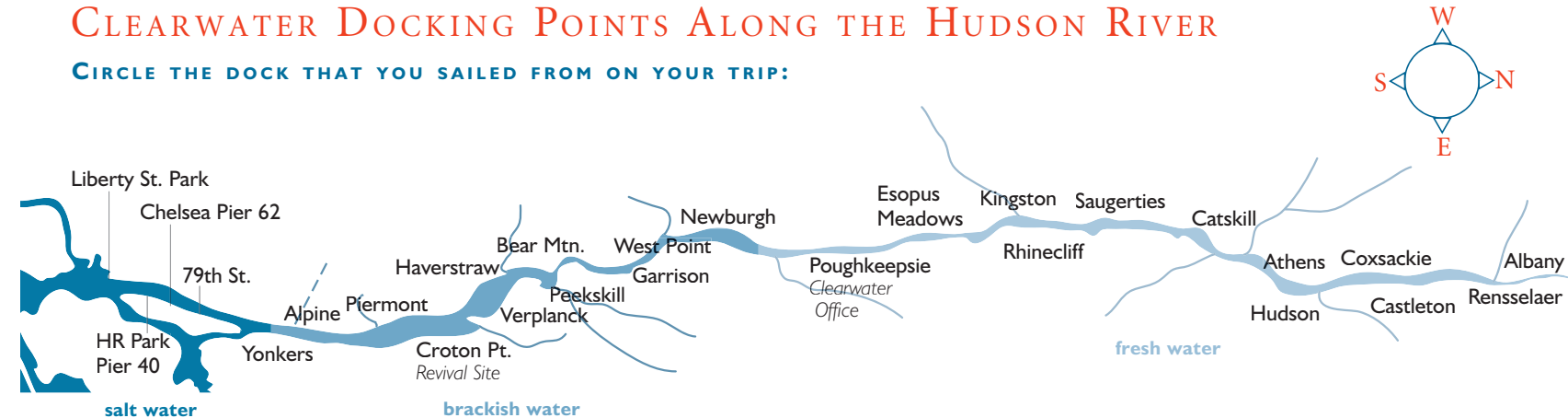


Since *Clearwater* was launched in 1969, the river has become much healthier. Laws have been passed to limit the amount of waste that can be dumped in the river. Now that you have sailed on the Hudson River, you know how essential the estuary is to hundreds of important fish and animal species. *Do you think the job is done? Is it okay to keep dumping pollution in the river? Or should we keep the cleanup going?*

What can YOU do to help keep the Hudson River clean and healthy?

CLEARWATER DOCKING POINTS ALONG THE HUDSON RIVER

CIRCLE THE DOCK THAT YOU SAILED FROM ON YOUR TRIP:



DATA COLLECTION

FILL OUT AS MANY AS YOU CAN. IF YOU DON'T HAVE ALL THE ANSWERS, TRY ASKING YOUR CLASSMATES OR TEACHERS.

Dock you sailed from: _____

Weather:

Types of clouds _____

Water temperature _____

Wind direction _____

Air temperature _____

Water Quality:

Dissolved Oxygen _____ ppm

Water temperature _____

Salinity _____ ppt

Turbidity _____

pH _____

Water depth at any point during the voyage: _____ feet or fathoms

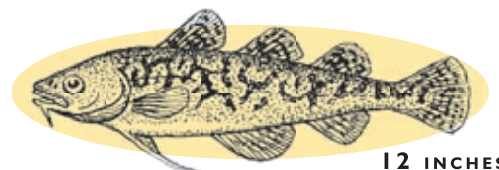
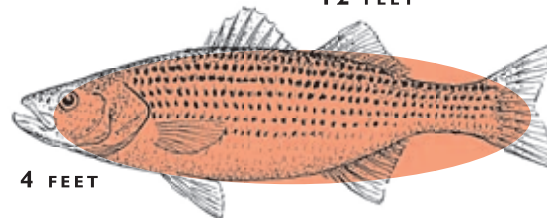
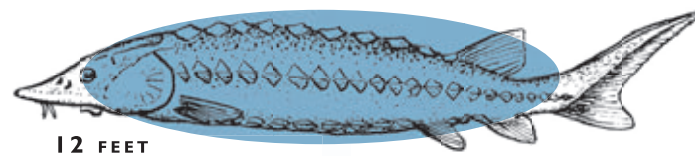
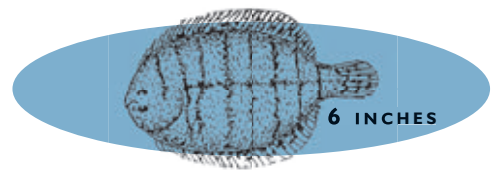
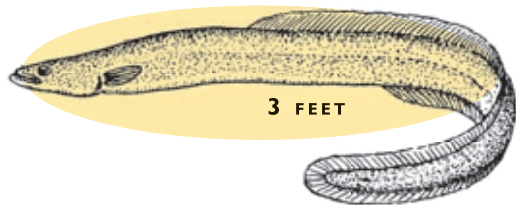
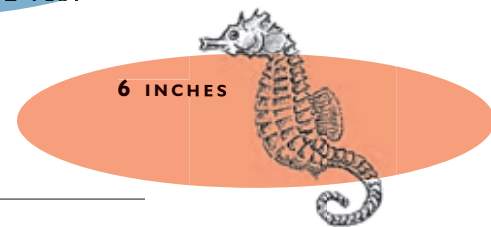
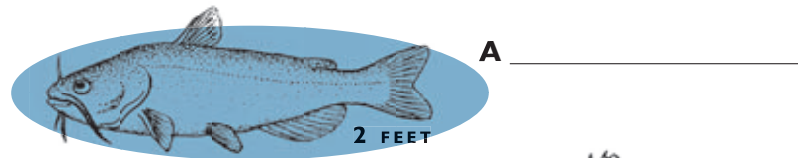
Plankton or invertebrates observed: _____

Types of ships, vessels, or other forms of transportation seen: _____

Landmarks or buildings visible from the *Clearwater* deck: _____

THE ESTUARY BESTIARY

MARK THE FISH OR OTHER CREATURES YOU SAW ABOARD *CLEARWATER*. If you can identify them, better yet! Match the animals with the names to the right. The correct answers are on page 7.



- BLUE CRAB
- TOMCOD
- SEA HORSE
- STURGEON
- EEL
- CATFISH
- WHITE PERCH
- HOGCHOKER
- STRIPED BASS

HERE'S ONE WAY TO HELP SAVE THE HUDSON RIVER

JOIN CLEARWATER!

Become part of an active, informed community. Stay connected, receive action alerts, and take advantage of a full calendar of regular member sails. For a complete list of membership benefits, log onto:

WWW.CLEARWATER.ORG
(845) 454-7673

We have memberships for students, parents, families, and classrooms.

WHAT CAN YOU DO AS A CLEARWATER MEMBER?

SAIL! Arrange an education experience for your child's class or other students.

BRING YOUR FAMILY to learn about the Hudson River watershed and its traditions.

VOLUNTEER and have fun learning to sail, teach, and advocate for the environment in your community.

SHARE by becoming an onboard educator, Revival volunteer or community spokesperson.

WORK FOR CLEARWATER — watch our website for seasonal paid crew and intern opportunities.

CELEBRATE the river's traditions and culture at Revival, concerts, coffeehouses and community events throughout the year.

CLEARWATER MEMBERS MAKE GRASSROOTS ACTION POSSIBLE

Members represent Clearwater in their communities. Each year more than 250 volunteer crew return to their communities trained in ecology and outreach. Members are the driving force of Revival's outreach successes and often become the "go-to" people in their communities when environmental issues arise.

WWW.CLEARWATER.ORG

A DAY ON THE CLEARWATER

You probably started your voyage on *Clearwater* from a pier or dock along the river's edge. The *Clearwater* sails from communities as far north as Albany and as far south as New York Harbor and Long Island Sound.

Not all communities have docks that *Clearwater* can use. The water might be too shallow, there might be a bridge that is too low for *Clearwater's* mast — or the community might not have facilities for the public to enjoy its legal right of access to its river. *Do you think it is important for the public to have access to the river?*

CHECK OFF THE ACTIVITIES YOU PERFORMED AND THE SKILLS YOU LEARNED:

- Helped raise the 3,000-pound mainsail.
- Identified the physical dimensions of the sloop *Clearwater*.



This young sturgeon is alive and well, and will shortly be returned to the river.

- Learned about the importance of having free public access to our river.
- Helped set, tow, and retrieve the trawl net.
- Defined ESTUARY, SLOOP, and WATERSHED.
- Learned how fish breathe and sense things under water.
- Examined fish and other marine life in an aquarium.
- Examined plankton with magnifiers.
- Went below deck into the main cabin.
- Learned how the crew lives in comfortable simplicity.
- Located the sloop's position on a nautical chart.
- Determined direction with a compass.

... SKILLS FOR A LIFETIME



- Identified marks on a chart and saw the real features they represent.
- Steered the sloop!
- Spent a few moments in quiet, just looking and listening.
- Sang a sea chanty or song about the river and nature.
- Learned about pollution — and solutions — in the river.
- Talked about what people can do to make the river cleaner.



PERFORMED ONE OR MORE OF THESE WATER OBSERVATIONS:

- Dissolved Oxygen
- Salinity
- pH
- Temperature
- Turbidity
- Depth



WHAT IS CLEARWATER?

The sloop *Clearwater* was built in 1969 as a replica of similar boats that moved cargo up and down the Hudson in the 19th century. Rather than transporting goods, today's *Clearwater* delivers educational programs and a message about respect for the Hudson River. The *Clearwater* was built as a reminder to people of how wonderful it is to sail on a clean river.



Clearwater's mission has three main parts: **Educating** people about the Hudson River and New York Harbor; showing people how they can take **action** to clean up their river; and having fun by **celebrating** this beautiful river and watershed!

Hundreds of people worked together to build the *Clearwater*, and hundreds of thousands have sailed aboard her, just like you.

Answers to Estuary Bestiary Questions from page 4:

A: Catfish	F: White Perch
B: Sea Horse	G: Sturgeon
C: Eel	H: Striped Bass
D: Hogchoker	I: Tomcod
E: Blue Crab	How did you do?

AMERICA'S ENVIRONMENTAL FLAGSHIP



CLEARWATER

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Poughkeepsie, NY 12601

WWW.CLEARWATER.ORG

(845) 454-7673

Credits: cover map: National Oceanic and Atmospheric Administration; illustrations and photographs: Chris Bowser and Steve Stanne; water image (pg.4): DigitalVision.

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