

# Which Fish Where?

*Students will use tables and graphs of fish collection data to draw conclusions about where fish live in the Hudson estuary.*

**Objectives:** Students will use data presented in tables and graphs to:

- interpret organized observations and measurements;
- recognize simple patterns, sequences, and relationships;
- understand environmental factors that influence where fish live.

**Grade level:** Elementary (Grades 4-7)

**Subject Area:** Math, Science

**Standards:** Mathematics, Science, & Technology Standards 1, 4

**Skills:**

- Interpret data presented in tables and graphs.
- Observe, identify, and communicate patterns.
- Present inferences or generalizations indicated by data.

**Duration:**

Preparation time: 5 minutes

Activity time: 60 minutes or two 30 minute sessions

**Materials:** Each student should have:

- Worksheet: Which Fish Where?
- Hudson River Miles map (helpful but not required)
- Pencil

## Background:

The Hudson is home to a great variety and abundance of fishes. Each kind is found in certain parts of the estuary depending on its habitat and salinity preferences. Some of the river's fish are found only in salt water, seahorses for example, others only in fresh, like sunfish; a few can live in either, like hogchokers.

During DEC's annual autumn Day in the Life of the Hudson River event, students collect fish at sites all along the tidal Hudson and New York Harbor. The tables and graph in the worksheets show data for representative fish species and sites, not all. Most of the fish recorded on Day in the Life are caught in beach seines—curtains of netting with a pole at either end.

Locations along the Hudson are often measured in Hudson River Miles. Hudson River Miles start at the southern tip of Manhattan. This spot, called The Battery, is River Mile 0. The estuary part of the Hudson ends at the Federal Dam in Troy at River Mile 153.

## Activity:

1. Review the definition of estuary and salt front with the students. To reinforce these concepts, have the students do the math lesson "Tracking the Salt Front" from the Hudson River Estuary Program (see <http://www.dec.ny.gov/education/36595.html>)
2. Introduce the Hudson River Miles system.
3. Go over the worksheet with the class or hand out as an in-class or homework assignment.

## Assessment:

1. Have students share answers to questions from worksheets, or collect and grade sheets.
2. Find your community or the nearest river community on the Hudson River Miles map. Using the first table in the worksheet (Fish Caught on A Day in the Life of the Hudson River), have students predict which fish they would be most likely to catch at your location.

## Vocabulary:

**community:** a group of living things that interact and are located in one place

**estuary:** a body of water in which fresh and salt water meet

**fresh water:** water that is not salty

**Hudson River Miles:** distance north from the Battery at Manhattan's southern tip

**salt front:** the leading edge of seawater entering an estuary

**salt water:** seawater or other water that contains salt

**seine net:** a fishing net that hangs vertically between floats and weights

**upriver:** towards a stream's source

## Resources:

Find illustrations and information about the fish described in this activity at the Department of Environmental Conservation website [www.dec.ny.gov/animals/269.html](http://www.dec.ny.gov/animals/269.html) or the Estuary Program's gallery of Hudson River organisms <http://www.dec.ny.gov/education/88154.html>.

The Atlantic silverside and other fish of salt water are described in the Chesapeake Bay Program's Bay Field Guide [www.chesapeakebay.net/bfg\\_fish.aspx?menuitem=14340](http://www.chesapeakebay.net/bfg_fish.aspx?menuitem=14340).

Information about and data from the Day in the Life of the Hudson River is available at [www.ideo.columbia.edu/edu/k12/snapshotday/](http://www.ideo.columbia.edu/edu/k12/snapshotday/).

# Which Fish Where? ANSWER KEY

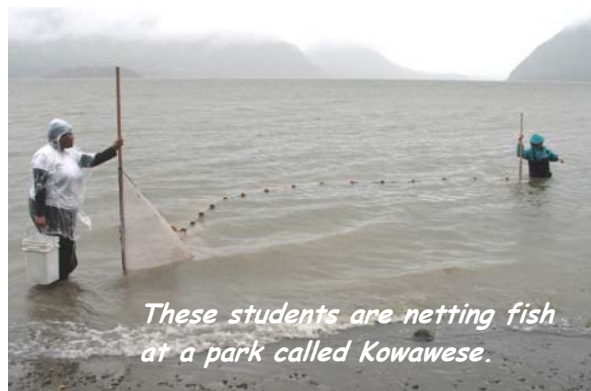
## Which Fish Where?

Many kinds of fish live in the Hudson. However, not all of these fish live everywhere in the river. People live in different sorts of **communities**, and so do fish. Some like **salt water**; others like **fresh**. Some prefer to live among plants; others prefer open water.



The information in the graphs and tables below was collected by students during the Day in the Life of the Hudson River event. On this day each fall, students catch fish at many places along the river. Then they compare results to see where different kinds of fish live.

Each place where students catch fish is located using **Hudson River Miles** (abbreviated as HRM). Hudson River Mile 0 is in New York City. Going north, the mile numbers get higher.



For example, Kowawese (pronounced Cow-ah-wee-see) is located in New Windsor at Hudson River Mile 59. The Cohotate Preserve is in Athens at Hudson River Mile 115. Albany, the capital of New York, is at Hudson River Mile 145.



## Fish Caught on A Day in the Life of the Hudson River October 2, 2007

		Fish Caught							
		<i>spottail shiner</i>	<i>banded killifish</i>	<i>Atlantic silverside</i>	<i>northern pipefish</i>	<i>white perch</i>	<i>striped bass</i>	<i>tessellated darter</i>	<i>hogchoker</i>
NORTH	127/Stuyvesant	51	5			5			1
	115/Athens	10	2			11		1	
	97/Ulster	14	1			26	15	7	15
	85/Staatsburgh	6	48					30	8
	76/Poughkeepsie	55	6			4	12	8	6
	59/New Windsor	8	1	15	1	32	40	1	
	55/Cold Spring	25	9	9		60	100	8	4
	41/Verplanck			180	1		12		
	36/Croton			9	2		107		
SOUTH	25/Piermont			113			26		
	18/Yonkers			67	1	2	16		1
	<b>TOTALS</b>	<b>169</b>	<b>72</b>	<b>393</b>	<b>5</b>	<b>140</b>	<b>328</b>	<b>55</b>	<b>35</b>

Use the table above to answer questions 1-4.

1. Which fish was caught in greatest numbers on October 2, 2007?

***Atlantic silverside (393)***

2. Which fish was caught in the most places on October 2?

***striped bass (8 places)***

3. If you had fished at Hudson River Mile 106 on this day, which four of the eight fish in the table would you have been most likely to catch? Why?

***spottail shiner, banded killifish, white perch, tessellated darter;  
caught at sites just to the north and to the south of HRM 106***

4. Salt water pushes into the Hudson River **estuary** from the Atlantic Ocean. The estuary is very salty near New York City at Hudson River Mile 0. Moving upriver, the water becomes less salty and eventually fresh. Some fish prefer salt water, others prefer fresh water. A few can live in both salt and fresh water. In the table, look at the locations where each of these fish was found. Then circle *salt*, *fresh*, or *both* to show what kind of water the fish prefers.

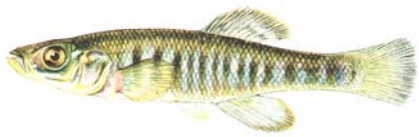


spottail shiner

*salt*

*fresh*

*both*

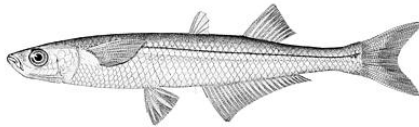


banded killifish

*salt*

*fresh*

*both*



Atlantic silverside

*salt*

*fresh*

*both*



northern pipefish

*salt*

*fresh*

*both*



white perch

*salt*

*fresh*

*both*



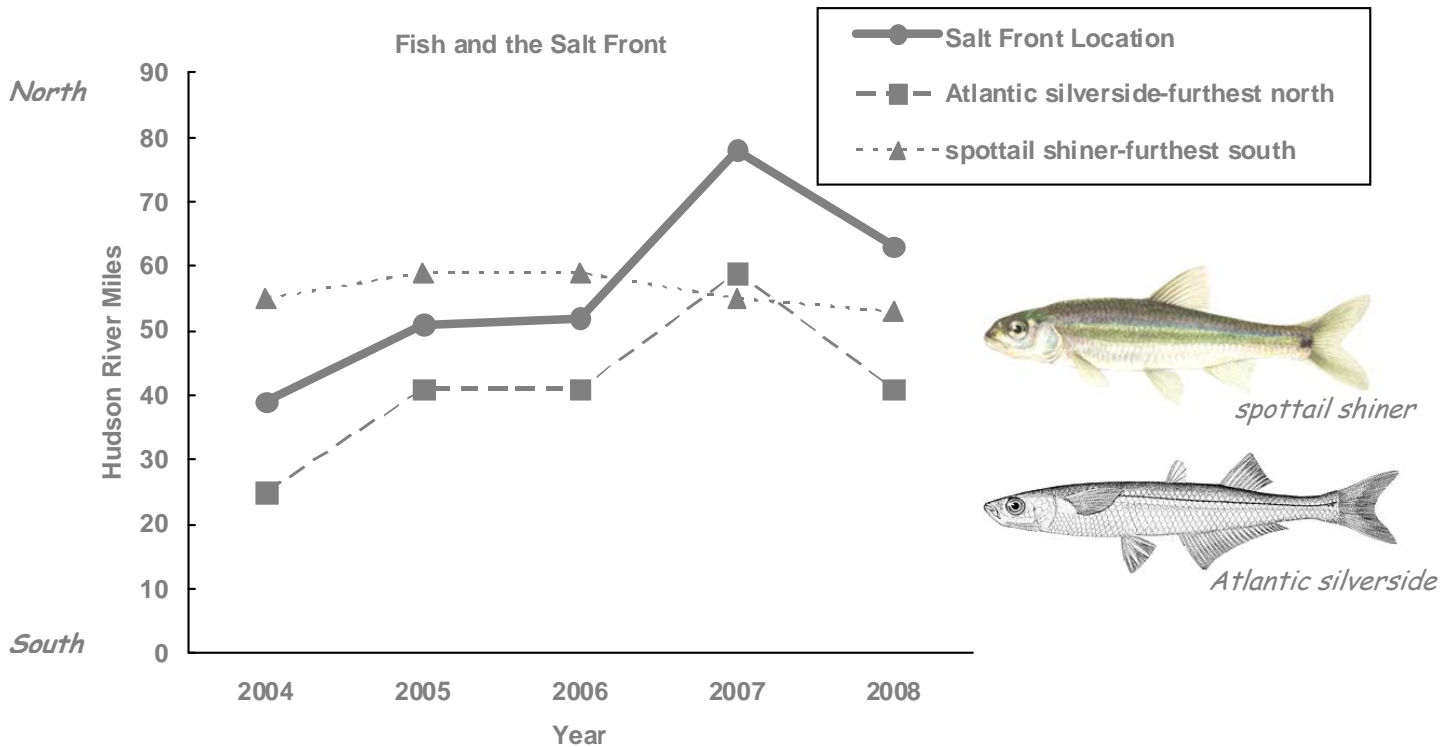
hogchoker

*salt*

*fresh*

*both*

5. The leading edge of salty ocean water moving up the Hudson is called the **salt front**. Water north of the salt front is fresh. Water south of the salt front becomes saltier towards New York Harbor at Hudson River Mile 0.



This graph shows how far north students found Atlantic silversides and how far south they found spottail shiners from 2004 to 2008. It also shows the salt front's location each year. **Use the graph to answer the questions below.**

- (a) In what year was the Atlantic silverside found farthest north?

**2007**

- (b) In what year was the spottail shiner found farthest south?

**2008**

- (c) Do Atlantic silversides move up and down the river with the salt front? How can you tell? **Yes; Atlantic silversides and the salt front move north and south in the same pattern.**

- (d) Do spottail shiners move up and down the river with the salt front? How can you tell? **No; spottail shiners do not move north and south in the same pattern as the salt front.**

6. The dots in these tables show the kinds of fish caught at the Cohotate Preserve, located in Athens, and at Kowawese, a park located in New Windsor, from 2006 to 2008. Use these tables to answer the questions below.

<i>Day in the Life Catches at the Cohotate Preserve, HRM 115</i>										
<i>Year</i>	<i>herring</i>	<i>bay anchovy</i>	<i>spottail shiner</i>	<i>banded killifish</i>	<i>Atlantic silverside</i>	<i>northern pipefish</i>	<i>white perch</i>	<i>striped bass</i>	<i>sunfish</i>	<i>tessellated darter</i>
2006	•		•	•			•	•	•	•
2007	•		•	•			•		•	•
2008	•		•	•			•		•	•

<i>Day in the Life Catches at Kowawese, HRM 59</i>										
<i>Year</i>	<i>herring</i>	<i>bay anchovy</i>	<i>spottail shiner</i>	<i>banded killifish</i>	<i>Atlantic silverside</i>	<i>northern pipefish</i>	<i>white perch</i>	<i>striped bass</i>	<i>sunfish</i>	<i>tessellated darter</i>
2006	•		•				•	•	•	
2007	•	•	•	•	•	•	•	•		•
2008	•			•			•	•		

(a) Over all three years, did students catch more kinds of fish at the Cohotate Preserve or at Kowawese?

***They caught more different kinds of fish (10) at Kowawese.***

(b) In which year and location did students catch the most different kinds of fish?

***2007 at Kowawese (9 kinds)***

(c) At Cohotate, students caught the same kinds of fish almost every year. In which year did they catch something different? What kind of fish was it?

***2006; striped bass***

**Challenge Question:** Explain why more kinds of fish have been caught at Kowawese, and why the catch there varies from year to year.

***Both saltwater and freshwater fish are caught at Kowawese; catch varies from year to year depending on location of salt front.***