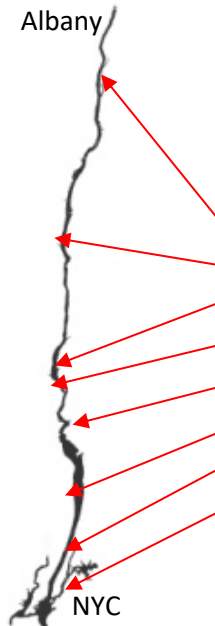


# A Day in the Life of the Hudson and Harbor 2020: Fishing

## Teacher Version

2020 was the 18<sup>th</sup> annual Day in the Life of the Hudson and Harbor, and the first virtual event. Over 50 sites were safely sampled by environmental organizations or small groups. Videos were made for three sections of the Hudson and Harbor. Thank you for being a part of this historic Day in the Life event!



Hudson River Mile	Site	Spottail shiner	Banded killifish	Bluegill	Striped bass	Atlantic silverside	Winter flounder
RM 133	Schodack Island	91	59	1	1		
RM 92	Kingston Point Park	30	25	1	6		
RM 65	Dennings Point, Beacon	2	2		1		
RM 57	Cornwall	9	4		11	16	
RM 43.5	Riverfront Green, Peekskill	31			135	58	
RM 25	Piermont				1	71	
RM 12.75	Inwood, Manhattan					27	
East River	Brooklyn Bridge Park (East)				3	518	1
Fill in the totals:		163	90	2	158	690	1

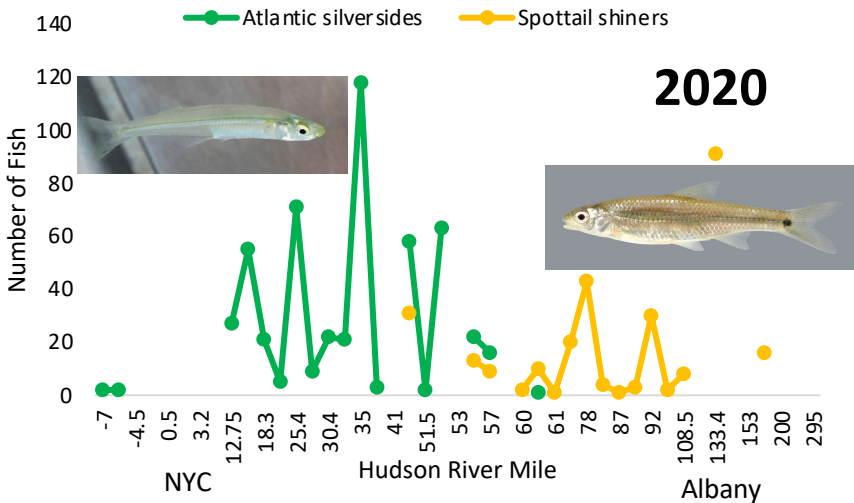
Answer the questions based on the table above:

- Which species was caught in the most places (on this list) on October 22, 2020? **STRIPED BASS**
- In the Hudson River Estuary, the water near the ocean is salty, while further upriver it is fresh. The leading edge of salty water is called the salt front. Atlantic silversides can be found pushing right up to the edge of the salt front. Based on the northernmost site listed here with Atlantic silversides, where would you estimate the location of the salt front on October 22nd? **NORTH OF RIVER MILE 57**
- Based on the location of the salt front, which of the listed fish species are found mainly in saltwater? **ATLANTIC SILVERSIDES, WINTER FLOUNDER**
- Which species are found mainly in freshwater? **SPOTTAIL SHINER, BANDED KILLIFISH**
- Which species is likely to be found throughout the whole estuary, in both fresh and salty water? **STRIPED BASS, A MIGRATORY SPECIES**

# A Day in the Life of the Hudson and Harbor 2020: Fishing

## Teacher Version

Just as Atlantic silversides are found in salty water up to the salt front, spottail shiners are found in freshwater down to the salt front (100 ppm Cl). You can use where the ranges of those two species of fish meet to predict the location of the salt front.



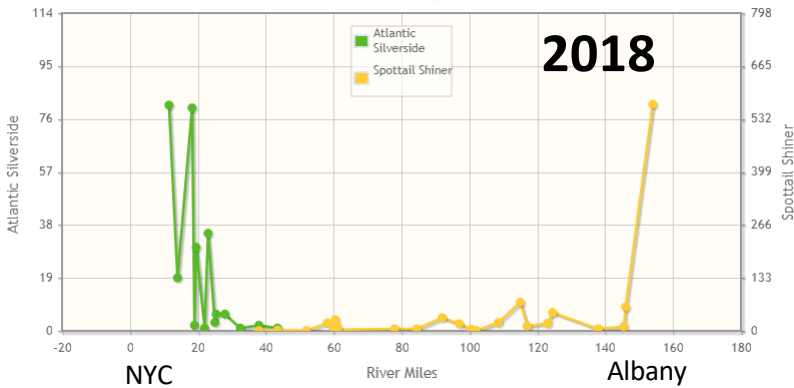
Data on distributions of Atlantic silversides and spottail shiners from 2020's Day in the Life of the Hudson and Harbor are shown in the graph to the left. What Hudson River Mile (starting at lower Manhattan) do you estimate the salt front was located on October 22<sup>nd</sup>?

**2020 salt front (100 ppm Cl):**

River Mile \_\_\_\_\_

*This year the salt front was around RM 74. With less sampling sites, it was harder to pinpoint an exact location. There was also significant overlap between Atlantic silversides and spottail shiners in 2020.*

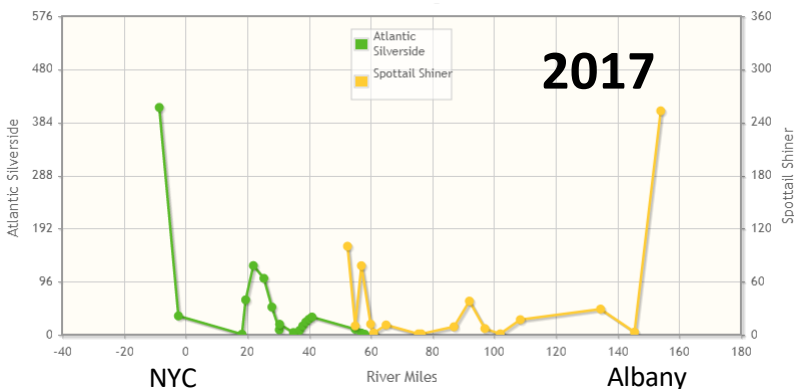
Below are graphs from 2018 and 2017 also showing where Atlantic silversides and spottail shiners were caught. Where do you predict the salt front was in those years?



**2018 salt front (100 ppm Cl):**

River Mile 25

*Students will likely predict higher based on the graph, but you can discuss with them that the fish and salinity data may not match up quite perfectly, but rather gives you a general sense of the location of the salt front.*



**2017 salt front (100 ppm Cl):**

River Mile 70

*Again, the location of the salt front is not EXACTLY where the fish catches match up, but it is close. Here the spottails were found a little below the salt front, whereas in 2017 the silversides were found a little above the salt front.*

What could cause the difference in the location of the salt front from year to year?

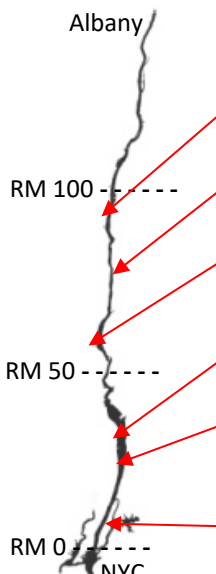
*Precipitation amount is a key factor in the location of the salt front. This year and in 2017 there was less rain than in 2018, which had a rainy summer and fall and pushed the salt front downriver.*

# A Day in the Life of the Hudson and Harbor 2020: Salinity

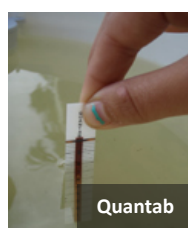
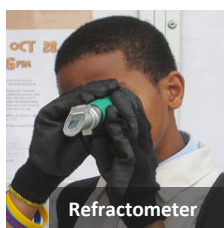
## Teacher Version

### Salinity Data Table

Salinity can be reported in many different units. Here the units are **parts per million (ppm)** of chloride (Cl<sup>-</sup>) to help compare results from sites far apart on the estuary. In saltier areas, like New York City, salinity is usually measured in **parts per thousand (ppt)**. **River miles (RM)** are measured north from the Battery in NYC.



RM	Site	2020	2019	2018	2017	2016
92	Kingston	36 ppm	69 ppm	Less than 30 ppm	43 ppm	40 ppm
76	Poughkeepsie	64 ppm	45 ppm	Less than 30 ppm	32 ppm	178 ppm
58	New Windsor	1,036 ppm	45 ppm	Less than 30 ppm	5,426 ppm	1,506 ppm
30	Upper Nyack	5,535 ppm	1,602 ppm	46 ppm	5,426 ppm	5,037 ppm
25	Piermont	6,089 ppm	2,426 ppm	74 ppm	6,642 ppm	13,000 ppm
4-6	Manhattan (West Side)	16,300 ppm	5,800 ppm	7,000 ppm	11,624 ppm	21,000 ppm



People use different tools to measure salinity. Hydrometers and refractometers are best used in saltier water, while quantabs are best for fresh and slightly salty water.

**1. The salt front (the leading edge of dilute sea water entering the Hudson) is located where salinity reaches 100 ppm.**

- Which sites from the table were considered freshwater in 2020?  
*Kingston, Poughkeepsie*
- In what year shown did the salt front reach the farthest north? Why might this be? Hint: How might weather affect salinity?  
*2016 had a very dry summer and fall, allowing for saltwater to push upriver past Poughkeepsie*
- In what year shown was the salt front the farthest south? What conditions would cause this?  
*In 2018 the salt front was unusually far south, all the way at Piermont (River Mile 25). A rainy summer and fall and a saturated watershed pushed the saltwater downriver in 2018.*

**2. Where was the salt front on October 22, 2020?**

Use a pencil to plot salinity readings for 2020 (found in the table above) on the graph on the next page.

- Place a point for salinity readings from Piermont to Kingston directly above the listed river mile.
- Using a ruler, draw a line from one point to the next. Start at the point for the lowest river mile and continue to the highest.
- The salt front is located where salinity equals 100 ppm of chlorides. Using your graph plot and the horizontal line at 100 ppm, estimate (in river miles) the position of the salt front on October 22.

