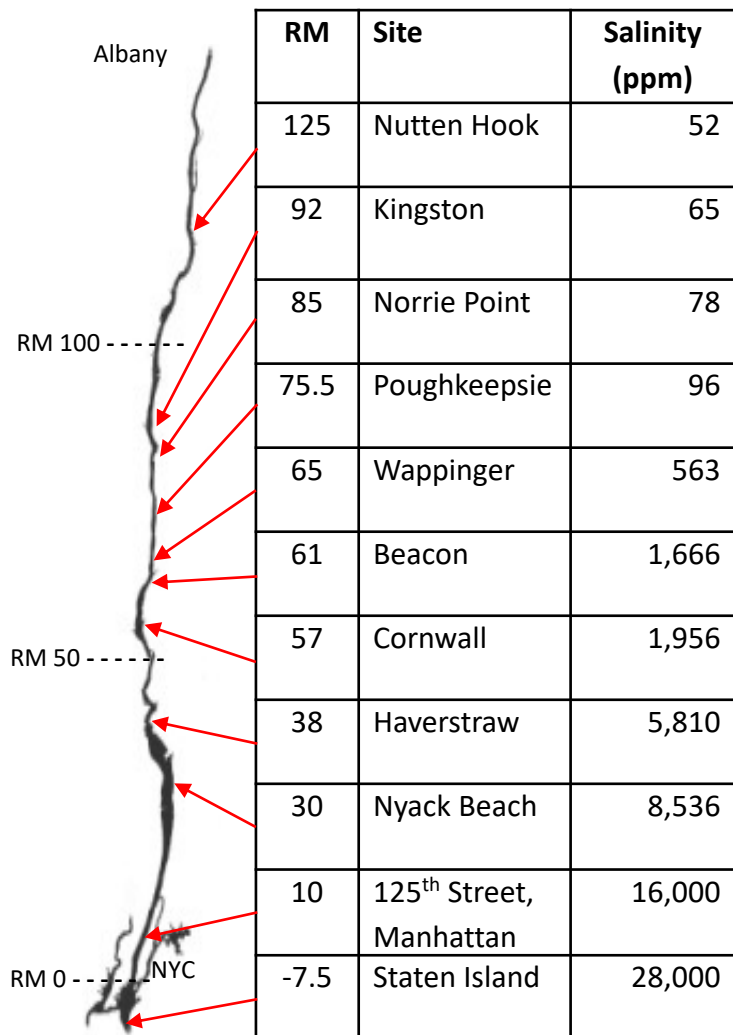


# A Day in the Life of the Hudson and Harbor 2022: Salinity

## Salinity Data 2022

Salinity can be reported in many different units. Here the units are **parts per million (ppm)** (a ratio of salt per one million parts of water) to 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.



### Where was the salt front on October 13, 2022?

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

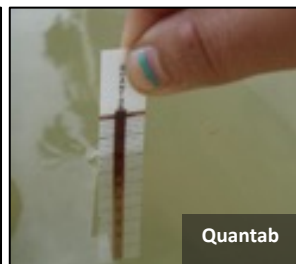
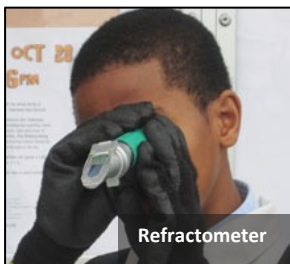
The salt front is where the river water becomes completely fresh, as opposed to salty or **brackish** (a mixture of salt and fresh water).

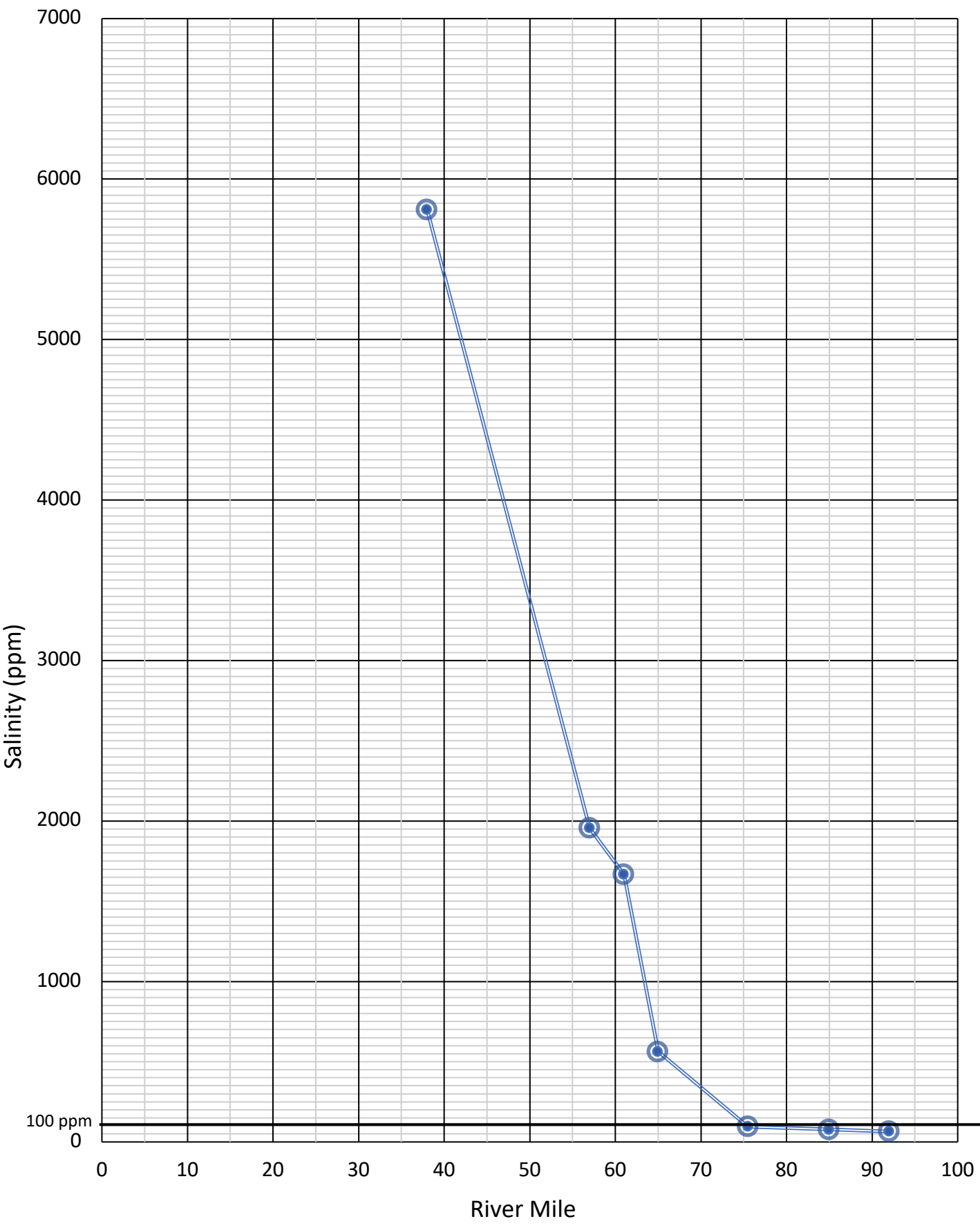
Use a pencil to plot salinity readings for 2022 (found in the table to the left) on the graph on the next page.

- Place a point for salinity readings from **Kingston through Haverstraw** 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.
- Using your graph plot and the horizontal line at 100 ppm, estimate (in river miles) the position of the salt front on October 13.

River Mile 76

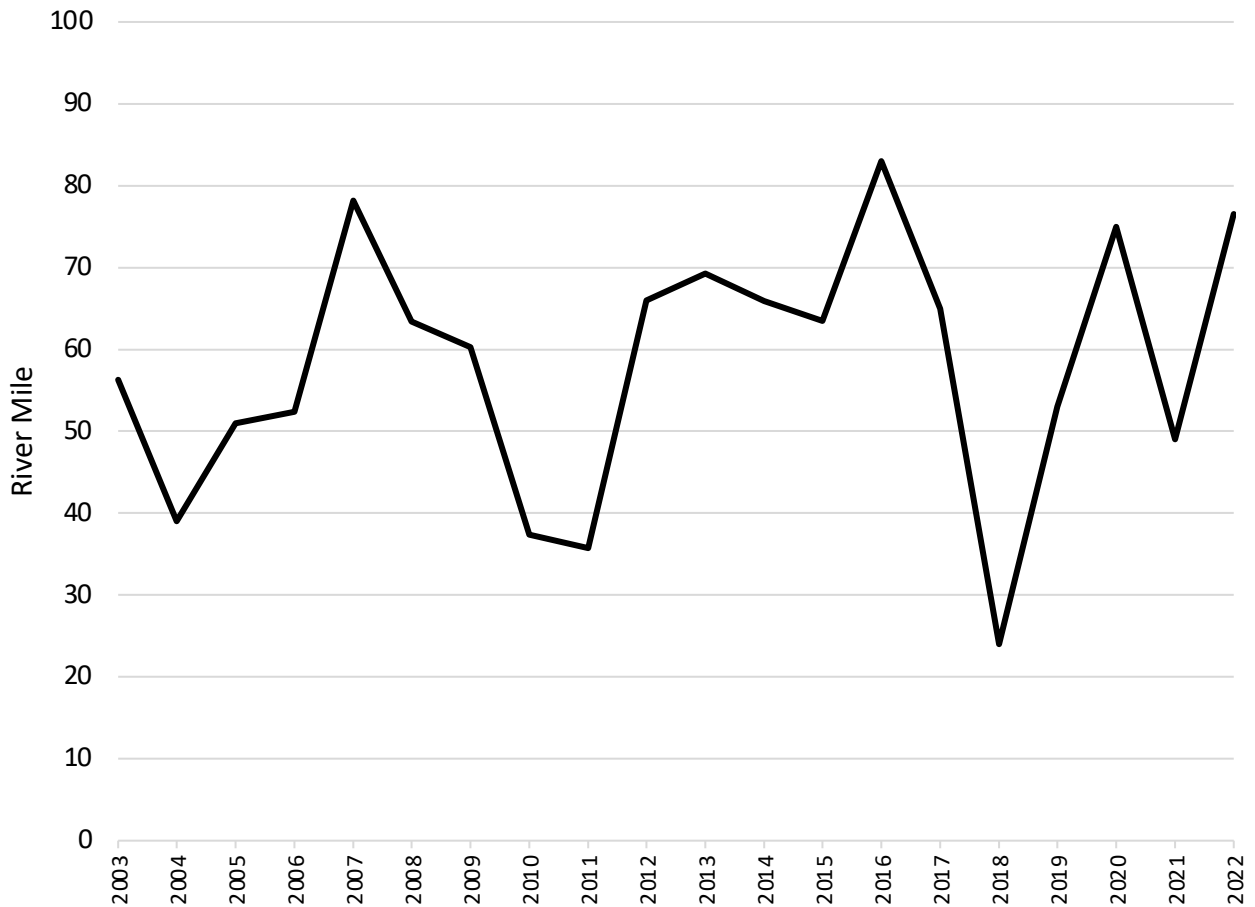
People use different tools to measure salinity. Hydrometers and refractometers are best used in saltier water, while quantabs are best for fresh and slightly salty water.





# 20 Years of Day in the Life Salinity Data!

## Hudson River Salt Front Locations



The salt front changes locations annually because of different environmental conditions.

- a. In what year shown did the salt front reach the farthest north? Why might this be? Hint: How might weather affect salinity?

**2016.** The salt front pushes north during times of minimal rain or drought. With less freshwater intake from the watershed, ocean water pushes higher up the river.

- b. In what year shown was the salt front the farthest south? What conditions would cause this?

**2018.** Heavy rain events caused large influxes of freshwater from the watershed. With high-flowing tributaries and lots of rain, the freshwater pushed south down the river, lowering the salt front.

**Bonus Questions:** What else might change year to year with the salinity?

This is an open question, so students may have a variety of answers. One parameter that is directly related to changes in salinity is fish distributions. The changing salt front can drive movement of salt tolerant/intolerant species. If students bring up potential relationships between parameters that you'd like to investigate further, you can explore the [Day in the Life interactive database](#), or [HRECOS water monitoring stations](#).

Would you predict higher or lower turbidity in years when the salt front is farther downriver? Why?

This is an opportunity for students to think through underlying drivers between factors (precipitation in this example). One plausible prediction is higher turbidity, since a lower salt front indicates higher rain levels, this rain would wash sediments out of the watershed and into the river. However, the rain would have had to be recent to increase the turbidity, whereas wet and dry conditions over a longer period of time can impact the location of the salt front. Students could also posit that a lower salt front may be in line with lower turbidity; since the ocean influence would not reach as high up the estuary, and it is the push of the ocean that causes sloshing/mixing of the estuary.