

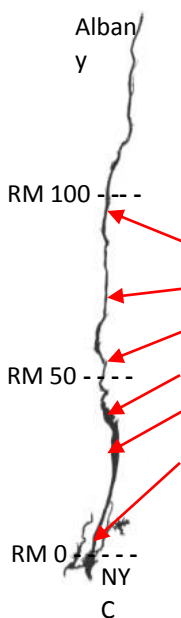
A Day in the Life of the Hudson and Harbor 2017: Salinity *Teacher Version*

Your site: _____ If measured, your salinity on Oct 12, 2017: _____

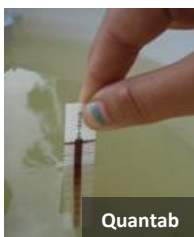
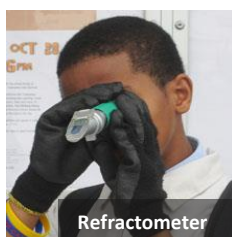
2017 was the fifteenth year of A Day in the Life of the Hudson and Harbor. Thanks to all of the participants who made this year a success! Let's compare some of the data you collected with data from earlier years.

Salinity Data Table

Salinity can be reported in many different units. Here the units are **parts per million (ppm)** of chloride (Cl⁻) 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)** total salinity. **River miles (RM)** are measured north from the Battery in NYC.



| RM | Site | 2011 | 2012 | 2016 | 2017 |
|----|----------------|-----------|-----------|------------|------------|
| 97 | Ulster Landing | 18 ppm | 28 ppm | 39 ppm | 32 ppm |
| 76 | Poughkeepsie | 32 ppm | 28 ppm | 136 ppm | 32 ppm |
| 57 | Kowawese | 26 ppm | 96 ppm | 2,768 ppm | 919 ppm |
| 41 | Verplanck | 55 ppm | 1,610 ppm | 4,428 ppm | 4,273 ppm |
| 25 | Piermont Pier | 1,250 ppm | 4,428 ppm | 6,366 ppm | 6,642 ppm |
| 4 | Pier 84 NYC | 1,383 ppm | 8,580 ppm | 11,071 ppm | 11,624 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 were considered freshwater in 2017?
Ulster Landing (Kingston) and 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 October 2011, freshwater runoff from Tropical Storms Irene and Lee was still moving through the watershed, pushing the salt down river.

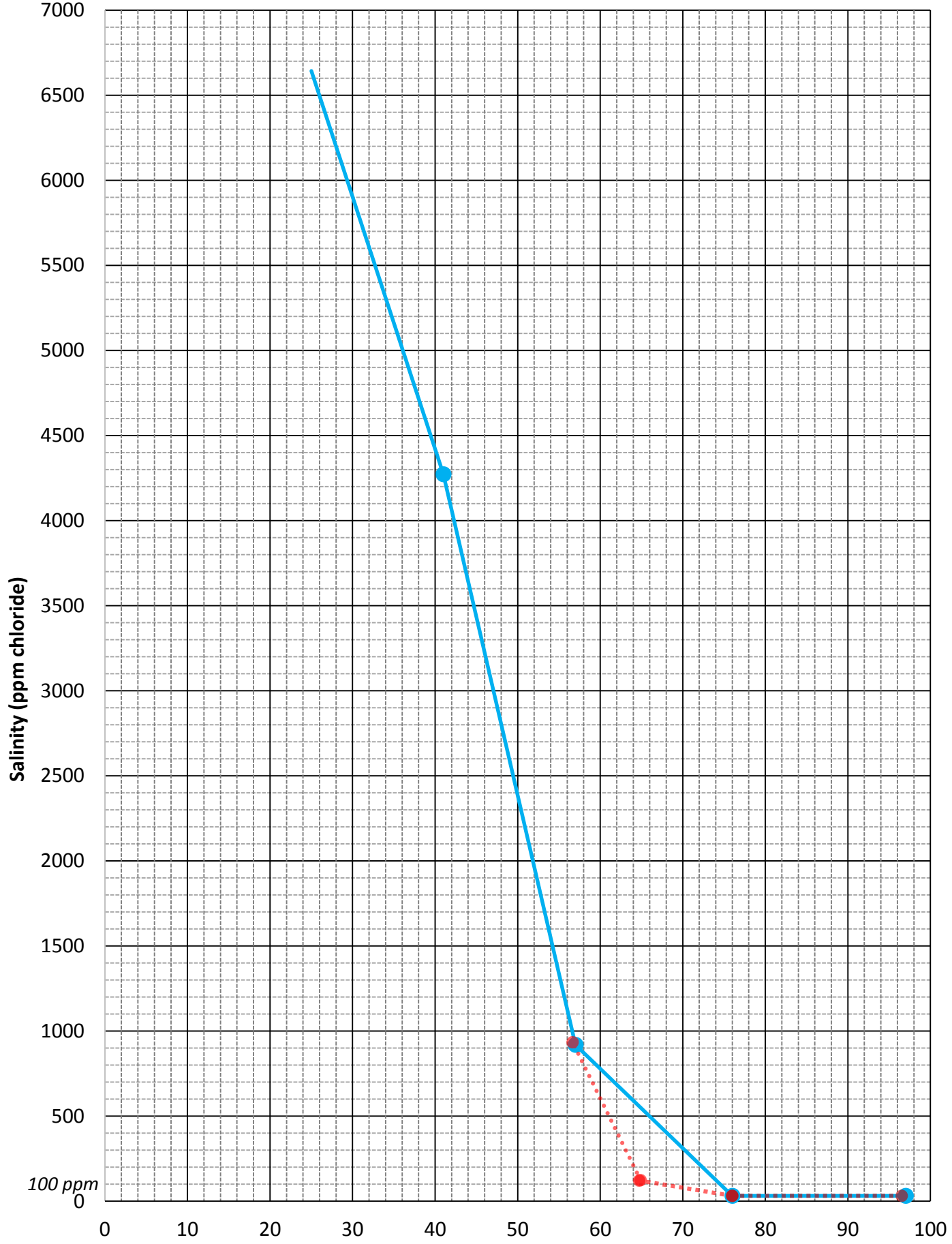
2. Where was the salt front on October 12, 2017?

Use a pencil to plot salinity readings for 2017 (found in the table above) on the graph below.

- Place a point for salinity readings from Piermont to Ulster Landing 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 12.
River Mile 75
- On October 12th students at Chelsea Boat Launch (RM 65) measured a salinity of 110 ppm. Plot this new piece of data on your graph and connect the surrounding data points. How does your graph change with the addition of this new data point? Where would you place the salt front?

Adding this new data point locates the salt front more precisely

River Mile 66



Hudson River Miles

*The red dash line is the updated salinity from RM 65