

# A Day in the Life of the Hudson River 2009: Salinity

October 8<sup>th</sup> was a great day, with 3000 students and educators sampling the Hudson River Estuary and connected waterways at over 60 sites. We're still going through all the data, but some interesting stories have already emerged...

Your Site: \_\_\_\_\_

If measured, your salinity: \_\_\_\_\_

## Salt Around the City

New York City is crisscrossed by waterways like the Hudson River, the East River, the Harlem River, the Bronx River, Jamaica Bay, and New York Harbor. But each waterway is different.

On a Day in the Life, students at Pier 40 in Manhattan measured the salinity of the Hudson River to be **16.8 parts per thousand**, about half the salinity of the ocean. But on the other side of Manhattan, under the Brooklyn Bridge on the East River, students found the salinity to be much higher at **25 parts per thousand**. Why would salinity be so different on opposite sides of Manhattan?

**Answers:** The East River connects two salty estuaries: New York Harbor and Long Island Sound. The Hudson River side of Manhattan is also connected directly to New York Harbor, but the water from the Hudson is less salty than the water from Long Island Sound. Note: Some students might observe that the Brooklyn Bridge is a bit south of Pier 40. This is true, but if you look at all the salinity data for the day, the East River is consistently higher than similar sites across town on the Hudson (see table below).



Students measure salinity at Pier 84 in Manhattan, close to the Intrepid dock.

**Salinity Data for the Hudson River and East River on October 8, 2009.** River Miles ("RM") are measured north from the Battery in Manhattan.

Hudson River site	salinity
RM 14 Englewood	12 ppt
RM 4 Intrepid Dock	16.6 ppt
RM 2 Pier 40	16.8 ppt

East River site	salinity
RM 8 Barreto Park	27 ppt
RM 4.5 Gantry Park	25 ppt
RM 1 Brooklyn Bridge	25 ppt

Lower NY Bay	salinity
Breezy Point	32.6 ppt



Map by NY/NJ Harbor Estuary Program

## Tracking the Salt Front

The Hudson River down by New York City has a lot of salt, especially compared to the River further north. The **salt front** is the border between slightly salty water and almost completely fresh water. "Almost" fresh because the salt front is defined as 100 parts per million of chlorides (an ingredient in salt), so low you can't even taste it!

On the morning of October 8<sup>th</sup>, students at Garrison Landing, about 53 miles north of Manhattan, measured salinity over several hours. At 9:30, they found the water had **33 parts per million (ppm)** of chloride. At 10:30, they found **46 ppm**. At 11:30, they found **109 ppm** of chloride.

How close were they to the salt front? Why do you think the salinity changed in just two hours? Hint: Can you guess what the tide was doing during those two hours?

**Answers:** Assuming their equipment was working correctly, the students at Garrison actually saw the salt front move past them! The tide was rising and flowing north that morning, so it makes sense to see salinity rise in that time period. USGS predicted the salt front a few miles north of Garrison, but two days of strong winds from the north and west led to blow out tides. This is a great example of how recording data at different times, over days or even hours, can reveal interesting things about the estuary.

The Day in the Life of the Hudson River website is <http://www.ldeo.columbia.edu/edu/k12/snapshotday/>. Highlights from A Day in the Life are featured on the HRECOS website at: <http://www.hrecos.org>.