

A Day in the Life of the Hudson River 2010: *Salinity Changes Year to Year*



Your site _____ If measured, your salinity on Oct. 14 _____

2010 was the eighth year of A Day in the Life of the Hudson River. Thanks to all of the participants who made this year a success!

Let's compare some salinity data you collected with some collected by students last year.



Salinity can be reported in many different units. Here we use *chloride* concentration in *parts per million (ppm)*, to help comparisons between sites along the estuary. In saltier areas like New York City, it is usually reported as *total salinity* in *parts per thousand (ppt)*. *River miles* are measured north from the Battery at Manhattan's southern tip.

River Mile	Site	2009 chloride	2010 chloride
153	Green Island	28 ppm	28 ppm
61	Long Dock Beacon	46 ppm	33 ppm
53	Garrison Landing	109 ppm	33 ppm
41	Verplanck	2,400 ppm	39 ppm
31	Nyack Beach	4,000 ppm	108 ppm
25	Piermont Pier	5,600 ppm	256 ppm
4	Pier 84 NYC	9,600 ppm	4,800 ppm
-11	Breezy Point	24,000 ppm	22,400 ppm

At many sites salinity was lower in 2010 than in 2009. The salt front (the border between salt and fresh water, defined as 100 ppm of **chloride**) was at **river mile 60** near Newburgh on A Day in the Life in 2009; in 2010 it was at **river mile 36** at Croton.

What are some reasons for the differences in salinity between the two years?
(Hint: Think about how weather could affect salinity)

Answers: The main reason the salt front was further south this year was precipitation. Runoff after rain flushes freshwater through the river, pushing salt water down the river towards the ocean. Even though it hadn't rained in the few days before Oct.14, runoff from heavy rains earlier in the month was still making its way into the river from the watershed.



Students measuring salinity at Pier 45, Manhattan



Atlantic silversides, a marker of salty conditions, at Englewood



Seining at Englewood

A Day in the Life of the Hudson River 2010: Salinity Differences in New York City



Using student reported data let's look at the *total salinity* (reported as parts per thousand - ppt) of two sites in the saltier section of the river. The total salinity is very different at Stuyvesant Cove on the East River compared to Pier 84 on the Hudson River, even though these sites are just a few miles across Manhattan from each other.



Map by the NY/NJ Harbor Estuary Program

River Mile	Site	Salinity
Hudson River 4	Hudson River Park Pier 84	6 ppt
East River 4	Stuyvesant Cove	23 ppt



Students measure salinity at Pier 84

Why is the East River saltier than the Hudson River?
(Hint: Where does the water come from at both sites?)

Answers: The East River connects New York Harbor and Long Island Sound, both salty estuaries, so there are two saltwater inputs. The Hudson River has a lot of freshwater input from the upper river and watershed, which dilutes the saltwater coming from the ocean.

The Day in the Life of the Hudson River website is <http://www.ldeo.columbia.edu/edu/k12/snapshotday/>