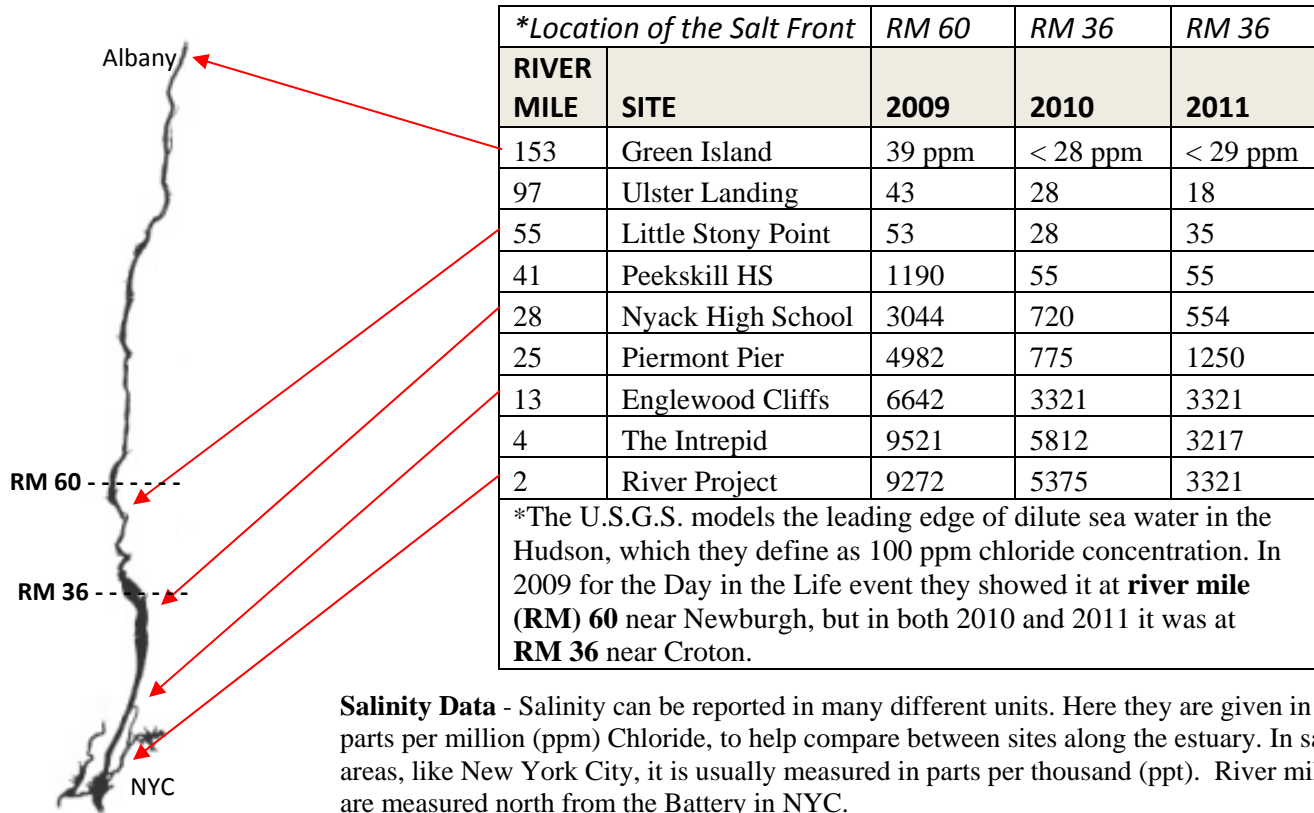


# A Day in the Life of the Hudson River 2011: *Salinity*

Your site: \_\_\_\_\_ If measured, your salinity on Oct 18<sup>th</sup>: \_\_\_\_\_

2011 was the ninth 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 data you collected with groups from the last two years.



**Salinity Data** - Salinity can be reported in many different units. Here they are given in parts per million (ppm) Chloride, to help compare between sites along the estuary. In saltier areas, like New York City, it is usually measured in parts per thousand (ppt). River miles are measured north from the Battery in NYC.

Look at the graph and notice how the salinity was lower at these sites in 2010 and 2011 compared to 2009. Focusing on 2011 and 2009, what could cause the **differences** in salinity between these two years? (Hint: Think about how weather affects salinity and write a hypothesis to explain these differences.)

Now let's take a second look at the graph. What could be the cause for the **similarities** in salinity between 2010 and 2011? (Hint: You might remember that Hurricane Irene dumped a lot of water in the valley this year. What might that tell you about the weather in 2010?)

You can check the location of the salt front yourself on the USGS website. Check the current location and then mark it on the map on the side of this page. USGS offers a data chart - <http://ny.water.usgs.gov/rt/pub/01376303.prn> which shows the full data set OR a single day data map - [http://ny.water.usgs.gov/projects/dialer\\_plots/hsfloc.gif](http://ny.water.usgs.gov/projects/dialer_plots/hsfloc.gif)

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

## Rainfall Data:

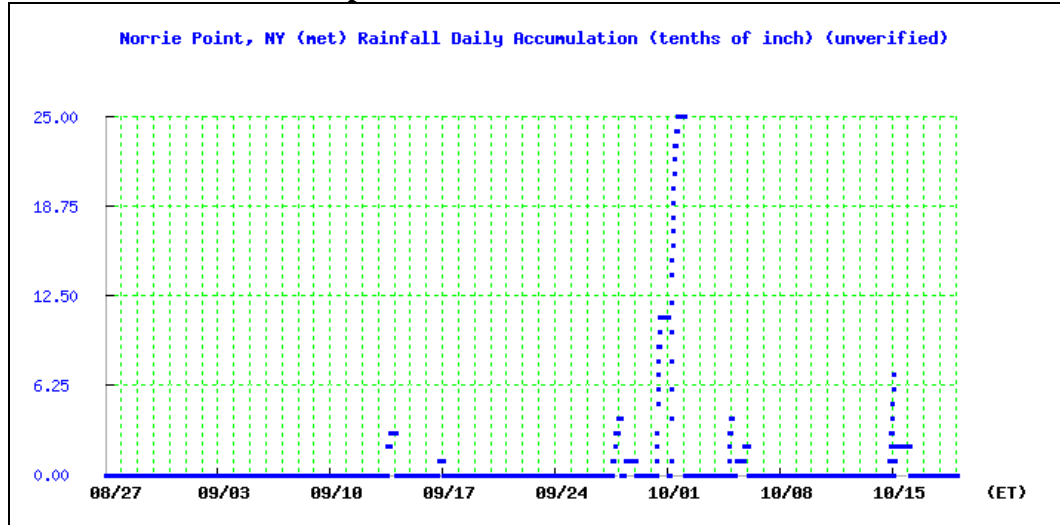
Now let's look at the graphs of rainfall from 2010 and 2011.

First look at the X axis and compare the time period. The dates for the two years cover the six weeks leading up to Day in the Life event. Now look at the Y axis. Note the differences – the scale on the 2011 graph is over twice as high as in 2010.

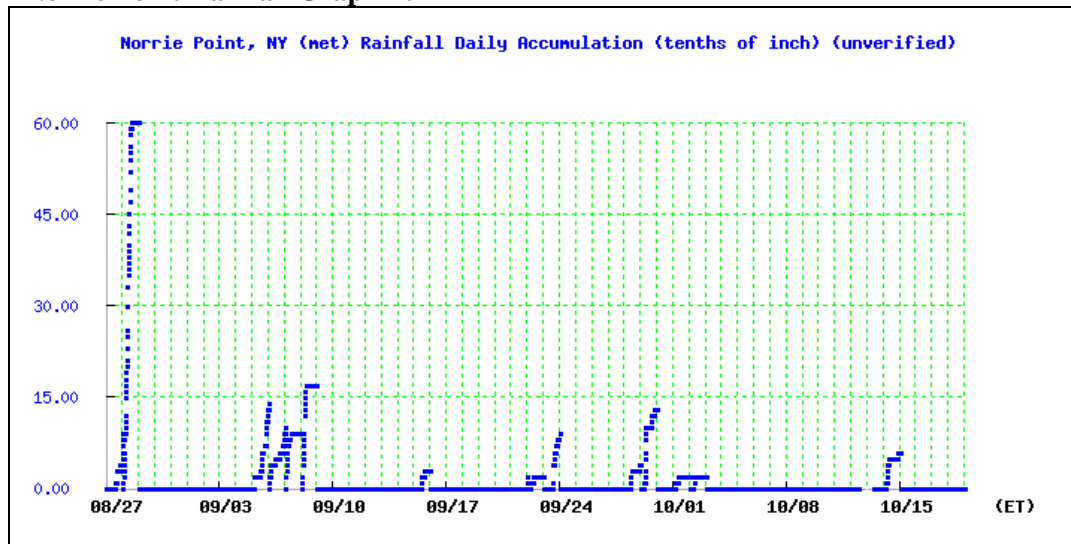
The rainfall data is recorded in tenths of an inch. How many inches of rain fell during the largest rain event in each year? 2010: \_\_\_\_\_ 2011: \_\_\_\_\_

Imagine this amount of water landing on the ground all through the Hudson River watershed. What will happen to the ground?

### Norrie Point Rainfall Graph 2010



### Norrie Point Rainfall Graph 2011



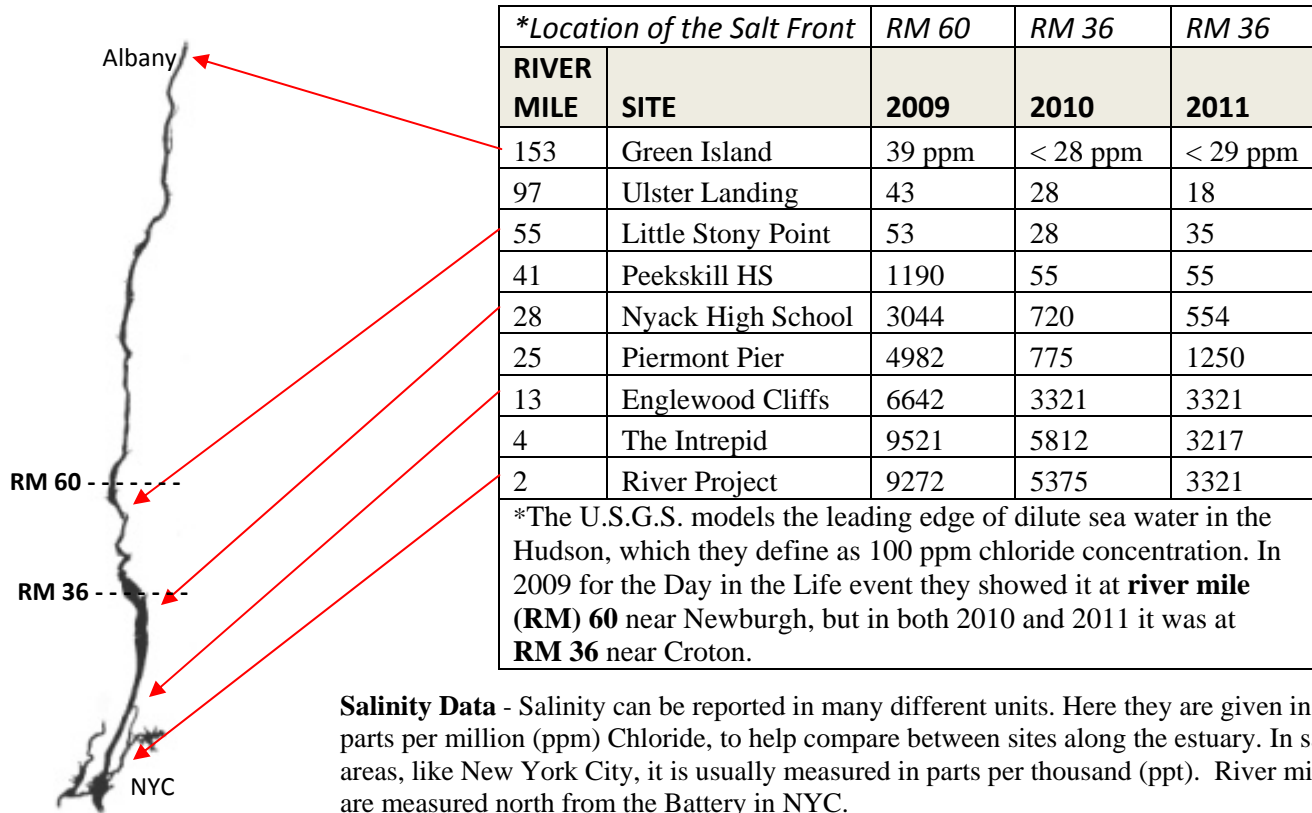
Think about the amounts and timing of the rain events. Why do you think the salinity for Day in the Life is similar in 2010 and 2011, when the rainfall in 2010 was so much less than in 2011?

Rainfall graphs are from the Hudson River's HRECOS system. To learn more about HRECOS and to collect information on the weather and water conditions in the river go to <http://www.hrecos.org/joomla/>  
The Day in the Life of the Hudson River website is <http://www.ldeo.columbia.edu/edu/k12/snapshotday/>

# A Day in the Life of the Hudson River 2011: *Salinity*

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Look at the graph and notice how the salinity was lower at these sites in 2010 and 2011 compared to 2009. Focusing on 2011 and 2009, what could cause the **differences** in salinity between these two years? (Hint: Think about how weather affects salinity and write a hypothesis to explain these differences.)

**"If there is a large rain event then the salinity in the Hudson River will decrease because of run off from the watershed. Year 2011 must have been rainier than year 2009."**

**In October 2011, the valley was still full of runoff from Hurricane Irene. All that freshwater pushed the salt front much further south than in the relatively dry year of 2009.**

Now let's take a second look at the graph. What could be the cause for the **similarities** in salinity between 2010 and 2011? (Hint: You might remember that Hurricane Irene dumped a lot of water in the valley this year. What might that tell you about the weather in 2010?)

**Even though we did not have a huge storm event in 2010 as we did in 2011, there was still a lot of rain in the weeks before the Day in the Life event. When Hurricane Irene hit in August it pushed the salt front far south, but by October 18<sup>th</sup> the salt front had come back north again.**

You can check the location of the salt front yourself on the USGS website. Check the current location and then mark it on the map on the side of this page. USGS offers a data chart - <http://ny.water.usgs.gov/rt/pub/01376303.prn> which shows the full data set OR a single day data map - [http://ny.water.usgs.gov/projects/dialer\\_plots/hsfloc.gif](http://ny.water.usgs.gov/projects/dialer_plots/hsfloc.gif)

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Now let's look at the graphs of rainfall from 2010 and 2011.

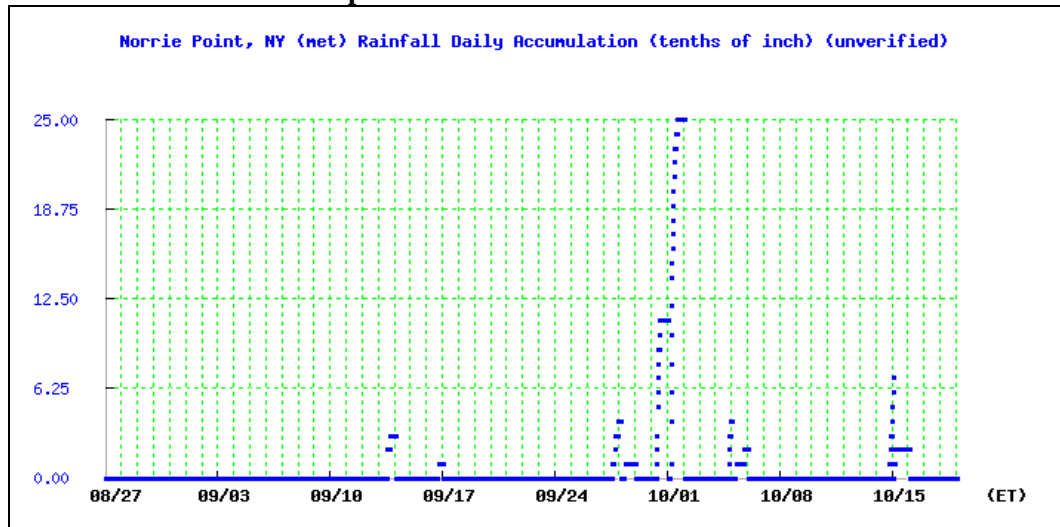
First look at the X axis and compare the time period. The dates for the two years cover the six weeks leading up to Day in the Life event. Now look at the Y axis. Note the differences – the scale on the 2011 graph is over twice as high as in 2010.

The rainfall data is recorded in tenths of an inch. How many inches of rain fell during the largest rain event in each year? 2010: 2.5 inches 2011: 6.0 inches.

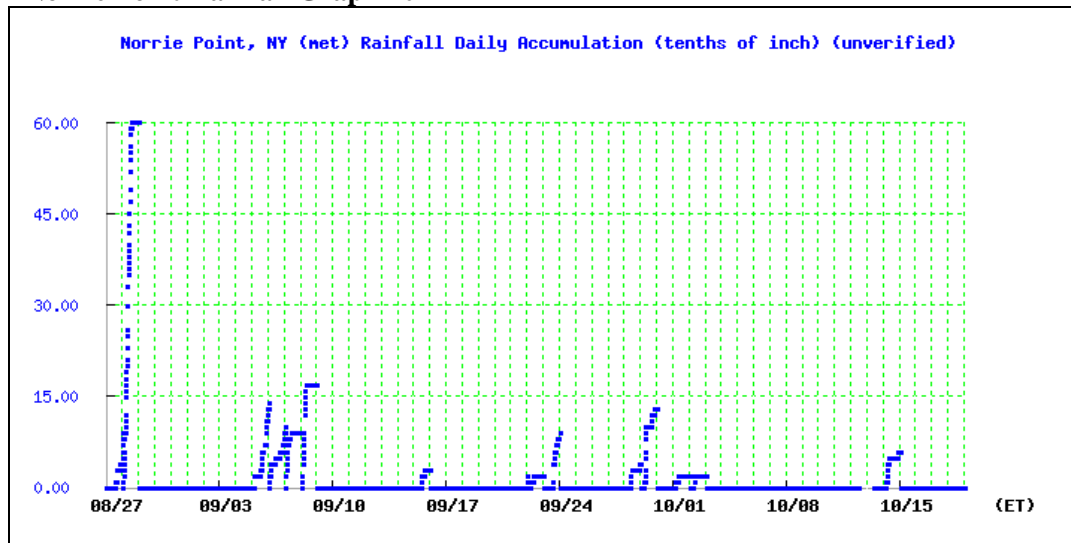
Imagine this amount of water landing on the ground all through the Hudson River watershed. What will happen to the ground?

This is a lot of water and the ground would saturate so that the rain would run off into the local tributaries (streams) and ultimately into the Hudson.

### Norrie Point Rainfall Graph 2010



### Norrie Point Rainfall Graph 2011



Think about the amounts and timing of the rain events. Why do you think the salinity for Day in the Life is similar in 2010 and 2011, when the rainfall in 2010 was so much less than in 2011?

The rainfall in 2010, while smaller in overall volume than 2011, occurred in a series of storms that were much closer to the Day in the Life event and so the impacts were still being felt through runoff to the estuary. In 2011 the Hudson watershed was saturated by Hurricane Irene, and this continued through the series of rain events that followed. In both cases the freshwater coming into the river from the tributaries was dominating the saltwater being pushed in from the Atlantic.

Rainfall graphs are from the Hudson River's HRECOS system. To learn more about HRECOS and to collect information on the weather and water conditions in the river go to <http://www.hrecos.org/joomla/>  
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