

Name \_\_\_\_\_

Date \_\_\_\_\_

### Hurricane!

Predictions from the 2007 Intergovernmental Panel on Climate Change (IPCC) indicate that large, flooding storms will increase in frequency in northeastern North America. These types of storms could be hurricanes, nor'easters, blizzards and large storms in general. How do you think this might change our local stream ecosystems? During this activity, you will learn about how the flow of water in a stream changes during a flood. You will also learn about why the timing of a flood can make a big difference in its overall impact.

#### Part 1: Reading

Read the article from the April 22, 2007, Poughkeepsie Journal and answer the following questions:

1. According to the USGS, how important was the April 2007 flood?
2. What natural factors contribute to the severity of a flood?
3. What human factors contribute to the severity of a flood?
4. What should be done to reduce the impact of future flooding?

#### Part 2: Create your graphs

Open the Excel spreadsheet "Hurricane". In it you will find 3 different worksheets. Click on the worksheet titled 'Hurricane Floyd'. In this worksheet, you'll find data from Hurricane Floyd that swept through New York in September 1999. Create a graph showing the change in flow (cubic feet per second, or cfs) during this storm. Now go to the worksheet with the data from the April 2007 flood. Create a graph showing the change in flow during this event. Notice that in both of these worksheets you'll find precipitation data for the months that the floods occurred; you'll need this information in order to answer the questions below.

#### Part 3: Questions

Based on your graphs, answer the following questions:

1. How much rain caused each of the floods? Which event had more rain? Based only on this information, which storm do you think would cause more flooding?
2. When and how high was peak flow for the Hurricane Floyd flood? If it is difficult to answer this by looking at your graph, you may have to go back to the data and find the date of the peak flow and look more closely at the time.
3. When and how high was peak flow for the April 2007 flood?
4. What was the normal rate of discharge before the two floods?
5. Think about which storm caused more rain to fall, and which storm had a higher stream flow rate. Why do you think this happened? Does this match with your predictions to question #1? Why or why not?
6. Notice the shape of the curves for the 2 different floods. How do they differ? Why?

#### Part 4: Historical Change

The Excel spreadsheet "Hurricane" contains a 3<sup>rd</sup> worksheet with historical peak flow data from Wappinger Creek at Red Oaks Mill. Plot the data and find the floods of September 1999 and April 2007. Were they historically the largest floods, or were there other times when the peak flow was higher? \_\_\_\_\_

Using the internet or the library, look up one of the floods you see on your graph. When did that flood occur, and what were some of the consequences?

## Part 5: Future Change

Read about predictions of storm intensity under various global warming scenarios. “Confronting Climate Change in the Northeast” by the Union of Concerned Scientists includes two relevant sections: pgs 15-31 explains the impacts on coastal systems, while pgs 62-65 explains the impacts on water in the northeast. The report can be downloaded at:

<http://www.northeastclimateimpacts.org/>. You can also use NASA’s Earth Observatory article on hurricanes to gather more information:

[http://earthobservatory.nasa.gov/Library/Hurricanes/hurricanes\\_1.html](http://earthobservatory.nasa.gov/Library/Hurricanes/hurricanes_1.html). Answer the following questions based on this reading

1. What is a hurricane? What category of storm causes the most damage? What kind of damage does it cause?
2. How many storms, on average, occur in the Atlantic Ocean each year?
3. Have the numbers of hurricanes been increasing or decreasing over the past 30 years? What evidence did you find to support your answer?
4. Based on the climate change report, what are the potential impacts of increasing storms on coastal systems? On water resources?
5. What impact are you the most concerned about? Why?