Effects of Hurricane Sandy and Massive Sewage Spill Captured by DNR Monitoring Stations in the Patuxent River

On October 29th and 30th, 2012, Hurricane Sandy impacted the mid-Atlantic region with high winds and significant amounts of precipitation. Hundreds of thousands of power outages were reported in Maryland and approximately 7-inches of rain fell in the Baltimore-Metropolitan area. A major sewage spill caused by a power outage associated with the storm was reported at the Little Patuxent Water Reclamation Facility on October 29th. The spill lasted for approximately 12 hours and dumped almost 20 million gallons of untreated, diluted sewage into the Little Patuxent, a tributary of the Patuxent River. Full details of this spill can be found through the Maryland Department of the Environment Reported Sewer Overflow Database.

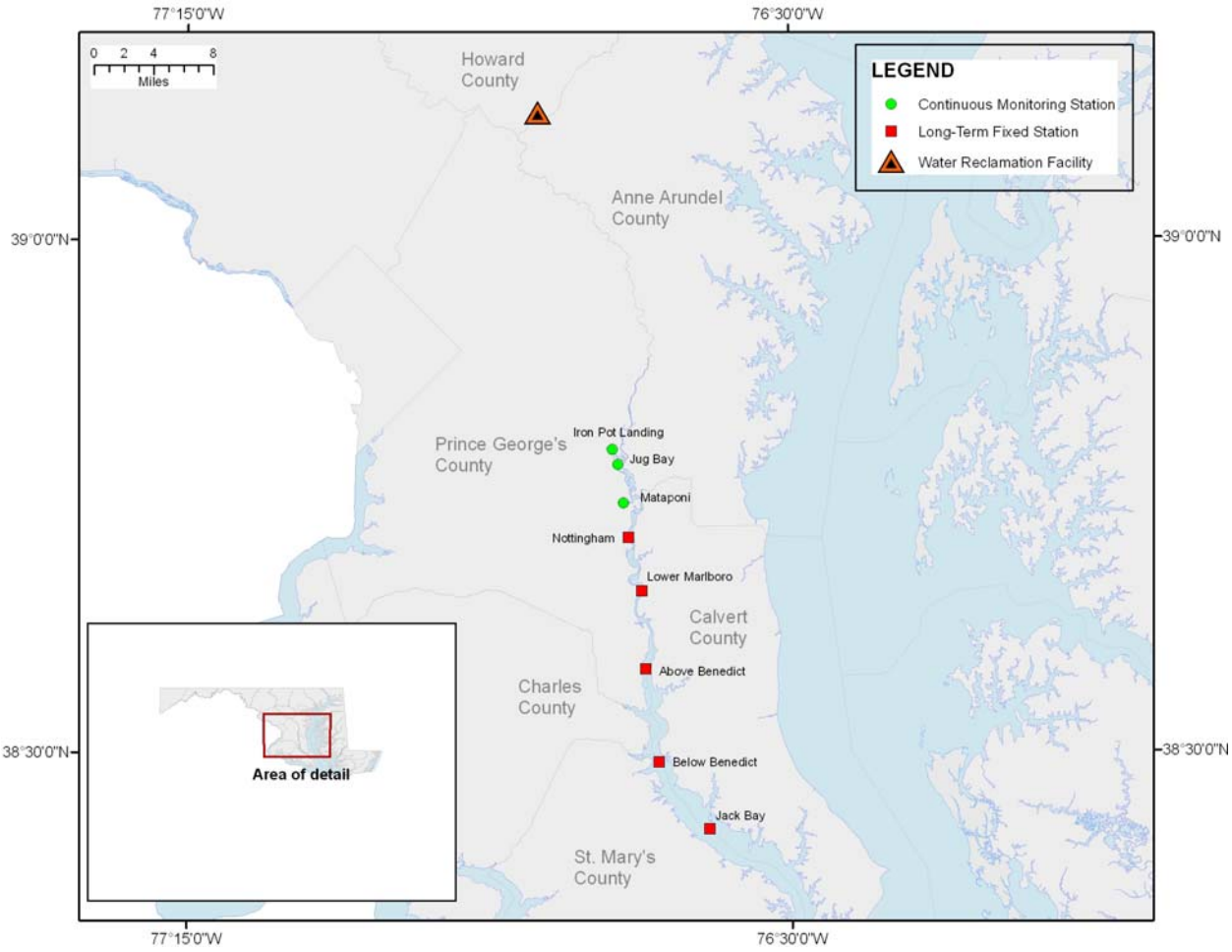


Figure 1. Map of the Patuxent River showing the location of the Water Reclamation Facility and select Maryland DNR monitoring stations.

The Little Patuxent empties into the Patuxent River near Crofton, MD. The river then flows south along the borders of Anne Arundel, Prince George's, Calvert, Charles, and St. Mary's counties, before reaching the Chesapeake Bay near Solomons, MD. Since 1985, Maryland DNR has maintained several Long-Term Fixed water quality monitoring stations throughout the Patuxent River (Figure 1). At these stations, physical measurements are taken and samples are collected 12 to 20 times per year and analyzed for a full suite of nutrient and biological parameters. In addition, Maryland DNR, in conjunction with the National Estuarine Research Reserve System, has maintained three Continuous Monitoring Stations in the Patuxent River since 2003 (Figure 1). These stations collect water quality readings every 15 minutes around the clock throughout the year. Data collected include water temperature, dissolved oxygen, salinity, turbidity (water clarity), and chlorophyll levels.

Long-Term Fixed Monitoring Stations

Measurements taken at Fixed Monitoring Stations in November after the storm affected the region show an influx of freshwater into the system as salinity levels, which are measurements of the salt concentration within the water, significantly dropped from those recorded in October before the storm (Figure 2).

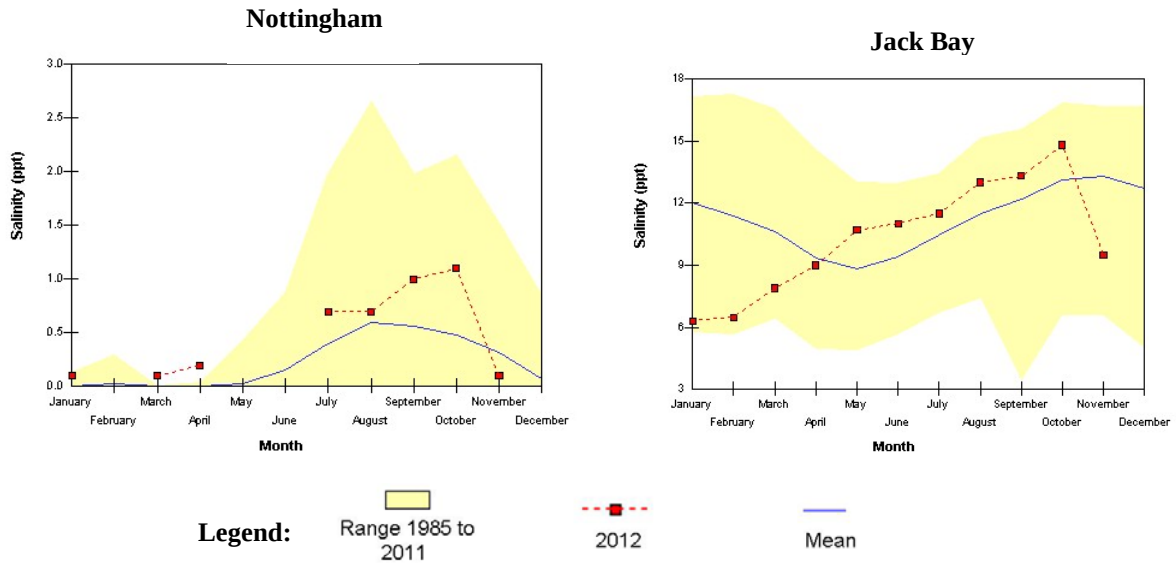


Figure 2. 2012 salinity levels recorded at the Nottingham and Jack Bay Long-Term Fixed Monitoring Stations.

At Fixed Monitoring Stations, DNR biologists measure how clear the water is by using a Secchi disk. A Secchi disk is a circular plate which is divided into quarters painted alternately black and white (Figure 3). The disk is lowered into the water until it is no longer visible, and that depth is measured. Secchi depth values that are high indicate clearer water, and low Secchi depths indicate cloudy water.

Figure 3. Secchi disk.

Secchi depth measurement recorded at Patuxent River Fixed Monitoring Stations in November were among the lowest that have been recorded at these stations since monitoring began in 1985 (Figure 4). These measurements indicate that the influx of water associated with Hurricane Sandy and related sewage spill carried high concentrations of particles and sediment that clouded the water.

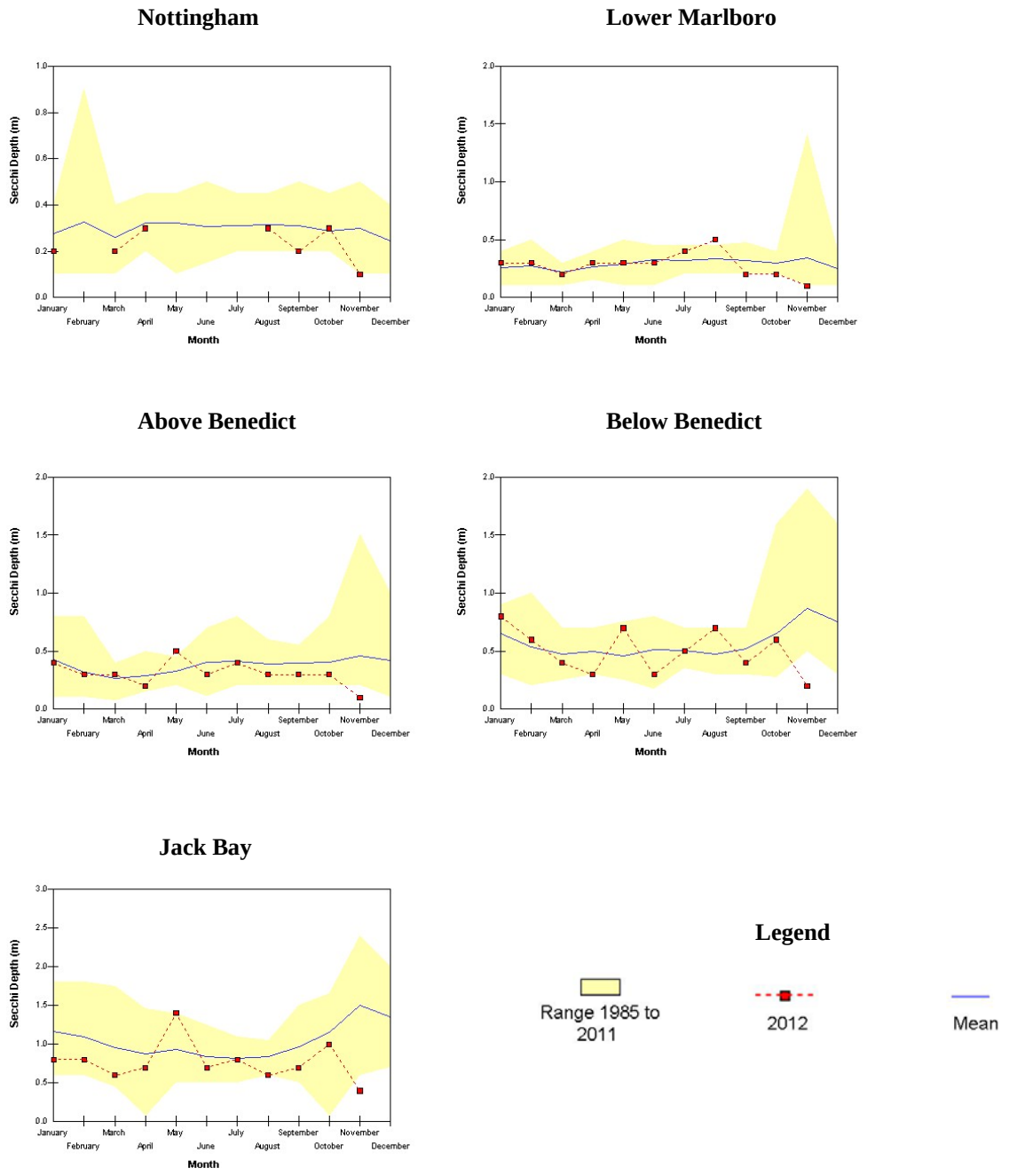
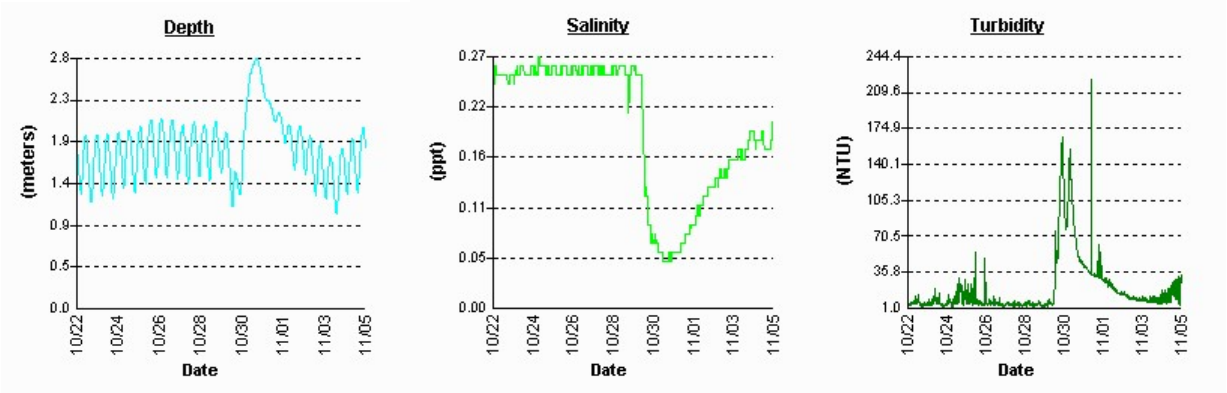


Figure 4. 2012 Secchi depth measurements recorded at Long-Term Fixed Monitoring Stations in the Patuxent River.

Continuous Monitoring Stations

Measurements recorded at the continuous monitoring stations at Iron Pot Landing, located just downstream from the Patuxent Water Treatment Plant, and Mataponi, located in Patuxent River Park, also indicate an influx of freshwater. Depth at both stations increased, due to high levels of water entering the river during the storm, and salinity decreased (Figure 5). Turbidity readings, which are another measure of how cloudy or clear the water is, also spiked very high during this time (Figure 5). Turbidity values over a threshold of 15 Nephelometric Turbidity Units (NTUs) are generally considered to be detrimental to bay grass growth and values at Iron Pot Landing and Mataponi spiked to over 150 NTU and 300 NTU, respectively.

Iron Pot Landing



Mataponi

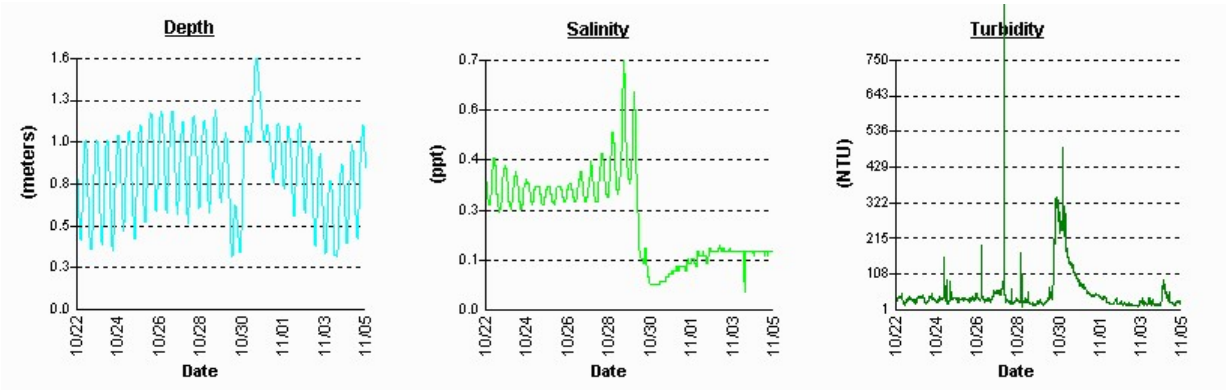


Figure 5. Depth, salinity, and turbidity measurements recorded between October 22nd and November 5th, 2012 at the Maryland DNR Continuous Monitoring stations at Iron Pot Landing and Mataponi on the Patuxent River.

The turbidity graphs in Figure 5 indicate that the initial effects of Hurricane Sandy and the associated sewage spill into the Patuxent River were short-lived. However, longer-term effects may not be readily apparent. Excessive nutrients, particularly nitrogen and phosphorus, flow into waterways with storm runoff and sewer overflows and have the potential to fuel algal blooms. These blooms can cloud the water for long periods of time and can depress the growth of underwater vegetation and decrease the health of fish by increasing stress levels and decreasing their ability to extract oxygen from the water. The death and decomposition of large algal blooms can also reduce oxygen levels in waterways to the point where fish and other aquatic animals cannot survive. Thus, Maryland DNR will continue to actively monitor and report on the condition of the Patuxent River and the Chesapeake Bay.

For the most recent Water Quality data for waterways throughout Maryland, please visit DNR's "Eyes on the Bay" website (www.eyesonthebay.net). You can also follow "Eyes on the Bay" on your mobile device (http://bit.ly/eotbmobile), Facebook, (Eyes on the Bay), and receive water quality alerts via Twitter (http://bit.ly/eotbalerts).