

Patapsco River Fish Kills

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Over 100,000 fish collectively died in the Patapsco River, including Baltimore Harbor, during late May. The cause of the fishkill was low dissolved oxygen levels associated with decomposition of an earlier algal bloom known as a mahogany tide (caused by the algae *Prorocentrum minimum*). Spring algal blooms are typical in the Chesapeake Bay and are often caused by excess nutrients entering the water.

This year's bloom in the Patapsco had some exceptionally high algal levels. A sample identified by MDE on April 26th from the mouth of the Middle Branch of Baltimore Harbor had a count of 935,821 cells/mL. Bloom levels approaching 3,000 cells/mL and greater typically give the water a reddish-brown tinge. Luckily, this intense bloom was fairly localized. However, significant bloom levels were seen throughout the River and Harbor in May. Maryland Department of Natural Resources (DNR) algae counts showed a peak of 94,234 cells/ml at the Fort McHenry site on May 22nd and a peak of 76,200 cells/ml on May 26 at Masonville Cove. The bloom lasted almost four weeks with algae levels typically four times State standards. You can track this bloom or current algal blooms online at DNR's web site at <http://bit.ly/mdhabs>.

While the bloom itself was not harmful to people or fish, when the bloom died it depleted oxygen in the water necessary for aquatic life. DNR continuous monitoring units showed oxygen levels plummet after the algae bloom crashed as bacteria decomposed the dead algae. Due to the magnitude of the bloom, oxygen levels in many areas approached or reached zero causing the massive fishkill. Other bay life were also affected including crabs and shrimp. The best way to decrease events like this in the future is to decrease nutrient sources in the region.

There are many sources of nutrient inputs to the Bay, including stormwater runoff, waste water treatment plant discharges, septic systems, agricultural runoff and atmospheric deposition to name a few. Extreme runoff events in 2011 associated with Hurricane Irene and Tropical Storm Lee, a very warm winter, a March sewage spill in the Patapsco, and even nutrient releases during Harbor dredging activities all contributed to the excess nutrients available for this year's algal bloom. Maryland, along with the other Chesapeake Bay watershed states (NY, PA, DE, WV, VA), the District of Columbia and the Environmental Protection Agency implemented a Baywide Total Maximum Daily Load or TMDL in December 2010 that set nutrient and sediment load allocations to reduce the inputs to restore and protect the Bay. Maryland State agencies are working with local governments to develop and implement Watershed Implementation Plans (WIPs) to provide reasonable assurance that we will meet our nutrient reduction targets by 2025.

Although much of the area has basically recuperated, anaerobic (no oxygen) conditions continue at the surface in and around Inner Harbor. Last Friday's storms are believed to be responsible for forcing much of the oxygen depleted bottom waters to the surface, which induced a strong hydrogen sulfide odor that still exists in this area. It is

likely that this condition was exacerbated by preexisting anaerobic conditions in the lower depths of the water column.