

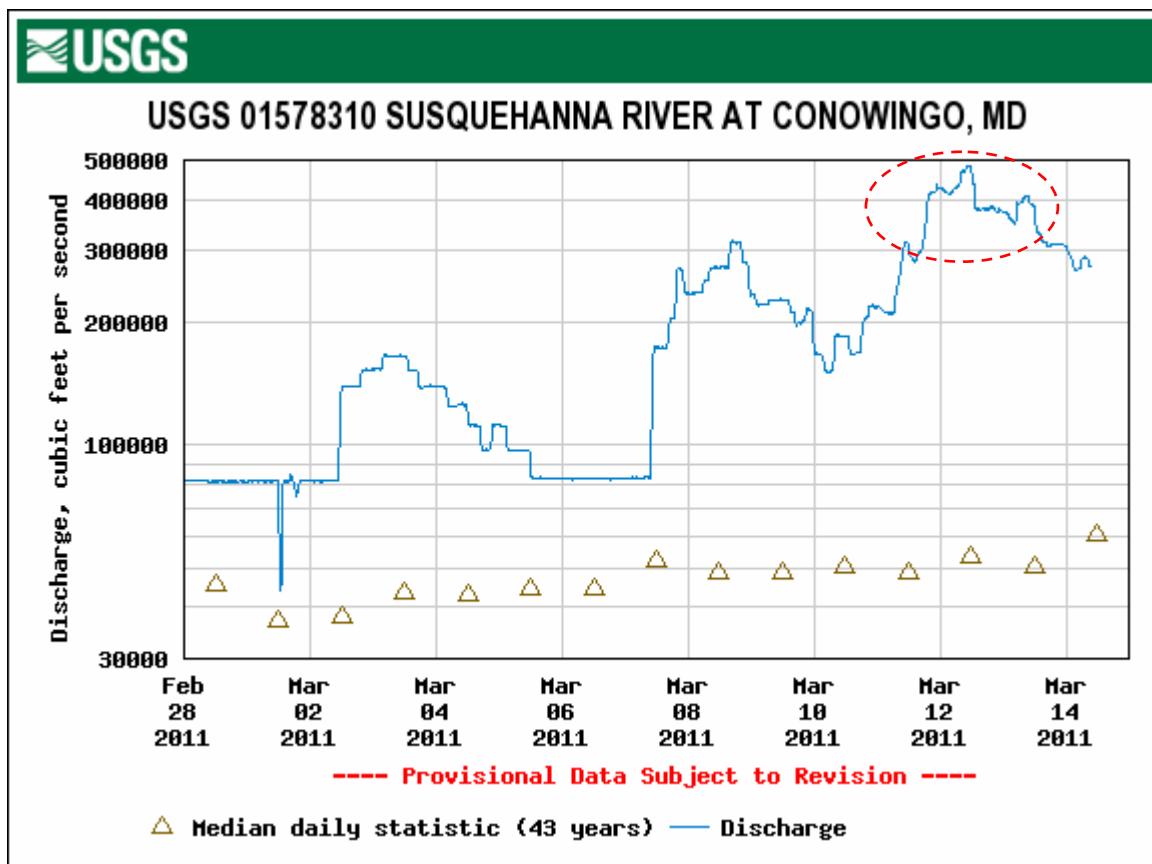
Heavy Spring showers bring floods to Chesapeake Bay

Spring showers may bring flowers, but over the past two years, early March runoff into the Susquehanna River watershed from heavy rains and snowmelt has brought a flood of nutrients and sediment-laden freshwater flowing into Chesapeake Bay. This heavy Spring runoff has resulted in record low water clarity for the month of March in many areas of Maryland's portion of the Chesapeake Bay. Continued wet Spring weather could extend these high flows that might result in less underwater grasses and an increase in algal blooms.

High March Flows

River flows can vary considerably, but in the last two years, water from heavy rains in early March falling on ground that is already saturated by earlier rains simply runs off toward the nearest stream. In many local watersheds, these waters eventually drain to Chesapeake Bay.

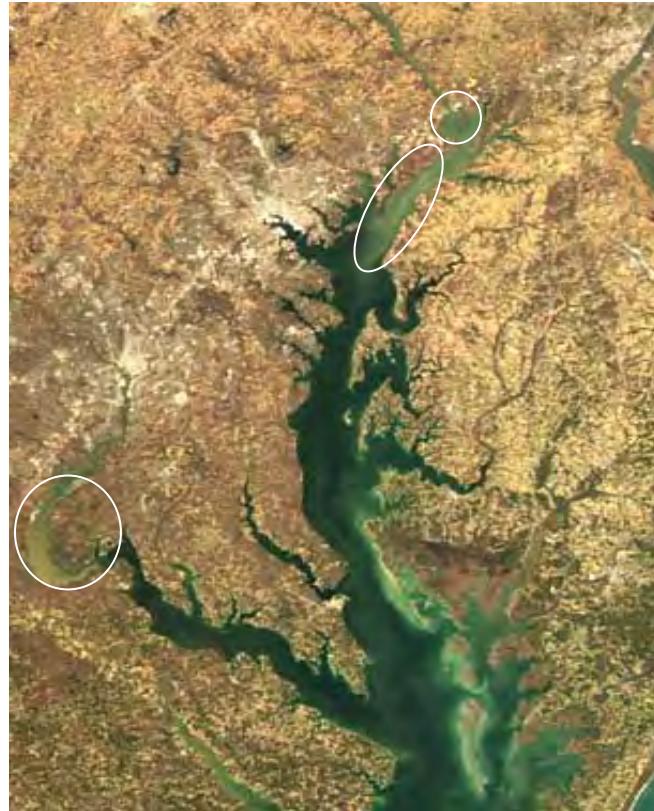
On March 12, 2011, two days after a very heavy rain event (2+ inches) across the region, US Geological Survey (*USGS*) recorded a peak "flow" of 485,000 cubic feet/second ('*cfs*') from the Susquehanna River at Conowingo Dam. Average monthly flows at that site in March are about 75,000 cfs. **NOTE:** *1 cubic foot of water per second (cfs) is a discharge that is equivalent to 448.8 gallons per minute.*



The estimated average discharge of the Susquehanna River at Conowingo Dam on March 12, 2011 was 414,000 cfs. To put this into another perspective, this discharge would fill the Baltimore Raven's NFL stadium nearly 1,110 times in a day (every 80 seconds). This is the highest average daily flow rate observed at the dam since floodwaters from Tropical Storm Ivan passed in September 2004 (496,000 cfs on September 19; 545,000 cfs on September 20.)

Satellite images of the upper Chesapeake Bay in March 2011 show the dramatic impact of heavy rains.

The first image (March 1, 2011) shows typical Chesapeake Bay conditions in early spring after several light rain events (about one-half inch) across the region. Low turbidity/good water clarity is observed with naturally higher turbidity levels in the upper Bay and Potomac River. Aquatic grasses in Susquehanna Flats are visible as a dark patch.



The next image (March 7, 2011) shows impacts on the Bay several days after a heavy, regional rain of about 1 inch. Waters are more turbid in the upper Bay and tidal rivers. Aquatic grasses in the upper Bay are not visible.

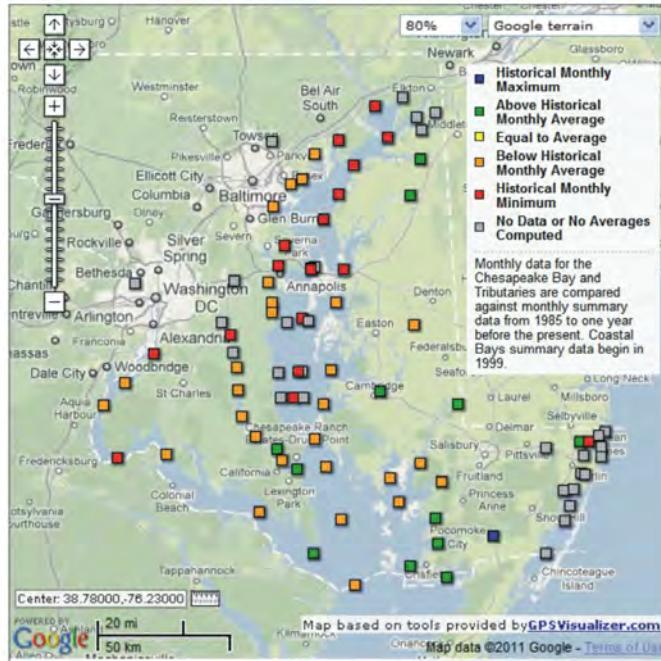


The third image (March 17th) shows a more extensive plume of turbid, nutrient-rich waters extending down Bay tributaries and further down Chesapeake Bay after the heavy, regional rains exceeding 2 inches.



The magnitude of these turbid plumes of suspended sediment have been documented by the State of Maryland water quality monitoring efforts in terms of water clarity, which is measured as the depth that a black and white disk lowered into the water disappears. A review of 26 years of water clarity data collected by the State shows that Secchi depth measurements in Chesapeake Bay and many tributaries in March 2011 are below historic measures or set new historic lows.

March 2011 Secchi depth vs. Historical Monthly Average Secchi depth (1985-2011)



On the surface, there is a change in color - passengers in vehicles crossing creeks, rivers and Chesapeake Bay may have gotten glimpses of light brown waters, obviously a change from the usual dark or olive-color. Below the surface, impacts on water quality and the plant and animal community can be significant and long-lasting.

This late winter/early spring season is a critical period for many aquatic species such as the underwater grasses, which are beginning to grow and the many types of fish, which are beginning to spawn. Heavier suspended sediments in this storm runoff begin to settle to the bottom in the Bay. This layer of new sediment may smother some bottom-dwelling animals and cover valuable spawning sites and habitat. Lighter sediments will remain suspended longer and reduce the amount of light necessary for growth of underwater grasses.

This storm runoff also contains nutrients (nitrogen and phosphorus) carried from lawns, fields, forests, parking lots and roads, as well as from overflowing sewers and flooded septic systems, into streams and rivers. Some nutrients will settle to the bottom of the Bay, while others may remain suspended in the water, providing fuel for growing algae that may include species harmful to fish, wildlife, pets or even people. Early season algal blooms may lead to early onset of dead-zones in the Bay's deeper waters - areas with low or no dissolved oxygen from late spring to early fall. In these areas, animals that can move (e.g. fish, crabs) can leave the areas while those that cannot move (e.g., oysters, clams) die.

Monitoring Maryland's progress towards restoring the Bay

Through its comprehensive Chesapeake Bay monitoring programs to determine how the impact of our Bay restoration are changing water quality and aquatic resources in the Bay, Maryland DNR also will be

assessing the short- and long-term impacts of this storm on the health of the Bay's water, habitat and its living resources.

Actions for restoring the Bay

The State of Maryland is committed to reducing polluted runoff in order to meet Federal pollution standards. In fact, Maryland (as well as Pennsylvania and Virginia) agreed in May 2009 to aggressive 2-year milestones for assuring accountability in limiting nutrients and sediments entering the Bay. This will require citizens, businesses, and local, state and federal governments to work together to reduce polluted runoff. The major actions include:

- Plant cover crops (to reduce polluted runoff from farms)
- Reduce polluted runoff from urban areas
- Restore natural filters (to reduce polluted runoff)
- Conserve high priority lands

So, what will the heavy rains of March bring to the Bay this year? In the short-term, the Bay waters will be more turbid than usual. As far as long-term impacts to the Bay's waters and its inhabitants, only time and MD-DNR's monitoring programs will tell.

For More Information

- Real-time Maryland Tidal Water Quality Conditions:
<http://mddnr.chesapeakebay.net/eyesonthabay/index.cfm>
- Restoring the Chesapeake Bay: Maryland's Actions and Progress:
<http://www.baystat.maryland.gov>
- What You Can Do to Help the Bay:
<http://www.dnr.state.md.us/bay/education/programs.html>
- US Geological Survey - Daily streamflow conditions in Maryland:
<http://waterdata.usgs.gov/md/nwis/rt>