The U.S. Geological Survey has compiled information about the streamflow into Chesapeake Bay and potential impacts of Isabel on the Bay and its watershed.

**How much water has entered the Chesapeake Bay from some previous tropical storms?**
Billions of gallons of water a day (BGD) enter the Chesapeake Bay from the rivers draining its 64,000 square-mile watershed. Water entering the Bay carries nutrients and sediment and impacts the salinity in the Bay. Several tropical storms have greatly impacted the amount of water entering the Bay. Similar effects could be delivered from Isabel. Some examples include:

| Storm | Date | Total inflow of water (gallons) | Normal inflow of water during these times (gallons) | Tropical storm inflow compared to normal inflow to the Bay |
|---|---|---|---|---|
| Agnes | June 21-27, 1972 | 4,810 billon | 291 billon | 16.5 |
| Juan | Nov 5-11, 1985 | 1,480 billon | 256 billon | 5.8 |
| Hazel | Oct. 16-22, 1954 | 517 billon | 210 billon | 2.5 |
| Floyd | Sept. 16-22, 1999 | 291 billon | 147 billon | 2.0 |
| Isabel | | | | |

**What are the current flow conditions of streams and rivers in the Bay watershed?**
Many streams are already above average due the rainfall over the past several months. A map of the levels in streams in the Mid-Atlantic, based on real-time data collection by the USGS, can be viewed at:
http://water.usgs.gov/waterwatch

The three largest rivers in the Chesapeake Bay also have real-time data collection. View the current conditions for the:
Susquehanna
01576000 Susquehanna River at Marietta, PA

Potomac
01646500 POTOMAC RIVER NEAR WASH, DC LITTLE FALLS PUMP STATION

James
02035000 JAMES RIVER AT CARTERSVILLE, VA

**How do the current conditions compare to historical water levels in the major rivers that enter the Bay? (Discharge in** cubic feet per second (cfs)

| River | Highest Discharge (cfs) | Date | Highest Discharge during Agnes, June 21-27, 1972 (cfs) | Highest during Isabel |
|---|---|---|---|---|
| Choptank near Greensboro, Md. | 6,970 | 8/4/67 | 2,760 | |
| Susquehanna At Conowingo, Md. | 1,130,000 | 6/24/72 (Agnes) | 1,130,000 | |
| Patuxent near Bowie, Md. | 11,500 | 6/6/79 | N/A | |
| Potomac near Washington, DC | 484,000 | 3/19/36 | 359,000 | |
| Rappahannock near Fredericksburg, VA | 140,000 | 10/16/42 | 107,000 | |
| Pamunkey near Hanover, Va | 40,300 | 8/23/69 | 29,900 | |
| Mattaponi near Beulahville, Va. | 16,900 | 6/25/72 (Agnes) | 16,900 | |
| James at Cartersville, Va. | 362,000 | 6/22/72 (Agnes) | 362,000 | |
| Appomattox at Matoaca, Va. | 40,800 | 10/7/72 | 22,800 | |

**What are the potential impacts of nutrients and sediment being delivered to the Bay?**

The large amounts of rain will cause an increase in nutrients and sediment in streams and rivers throughout the Bay watershed. Excess nutrients entering the Bay during the spring and summer cause algal blooms that consume oxygen as they decay and results in fish kills. The increased sediment can bury underwater grasses or cloud the light conditions in the Bay for their growth.

***There will be an increase in the amount of nutrients entering the Bay but not as much as if the increased rainfall came in the spring or early summer***.

The fall is generally not a time of high nutrient runoff from agricultural and suburban lands because crops and plants have used much of the fertilizer and manure that has been applied in the spring. Additionally, once the nutrients enter the Bay the conditions for algal blooms and subsequent loss of dissolved oxygen are not as favorable in the fall as they are in the summer. The waters in the Bay have begun to cool so there is more mixing and better exchange of oxygen throughout the Bay's water column.

***Conditions during Isabel will cause a large increase in sediment delivery to the Bay***.

Runoff into streams will lead to a large amount of sediment eroding from the land surface and stream banks. Additionally, sediments in the reservoirs, such as the Susquehanna River system, can be eroded and delivered into the Bay. The water in the Susquehanna has to reach a value of about 400,000 cubic feet per section for scour of the bottom sediment in reservoirs to occur. The last time this occurred was in January 1996 during the melting of snow from the blizzard of January 1996. Other large periods of scour included June 1972 (influence from Tropical Storm Agnes).

During the January 1996 storm, there a total of two to five inches of snowmelt combined with two to five inches of rainfall to result in widespread flooding. The January storm transported roughly three times the amount of fresh water, six times the amount of phosphorous, three times the amount of nitrogen, and 17 times the amount of sediment to the Chesapeake Bay than is typically transported to the Bay in an average January. If rainfall amounts are similar during Isabel, there could be a similar situation of water, nutrients, and sediment reaching the Bay.

Further information can be obtained from Scott Phillips, USGS, 410 238-4252 or swphilli@usgs.gov. Or visit our www site at Chesapeake.usgs.gov