



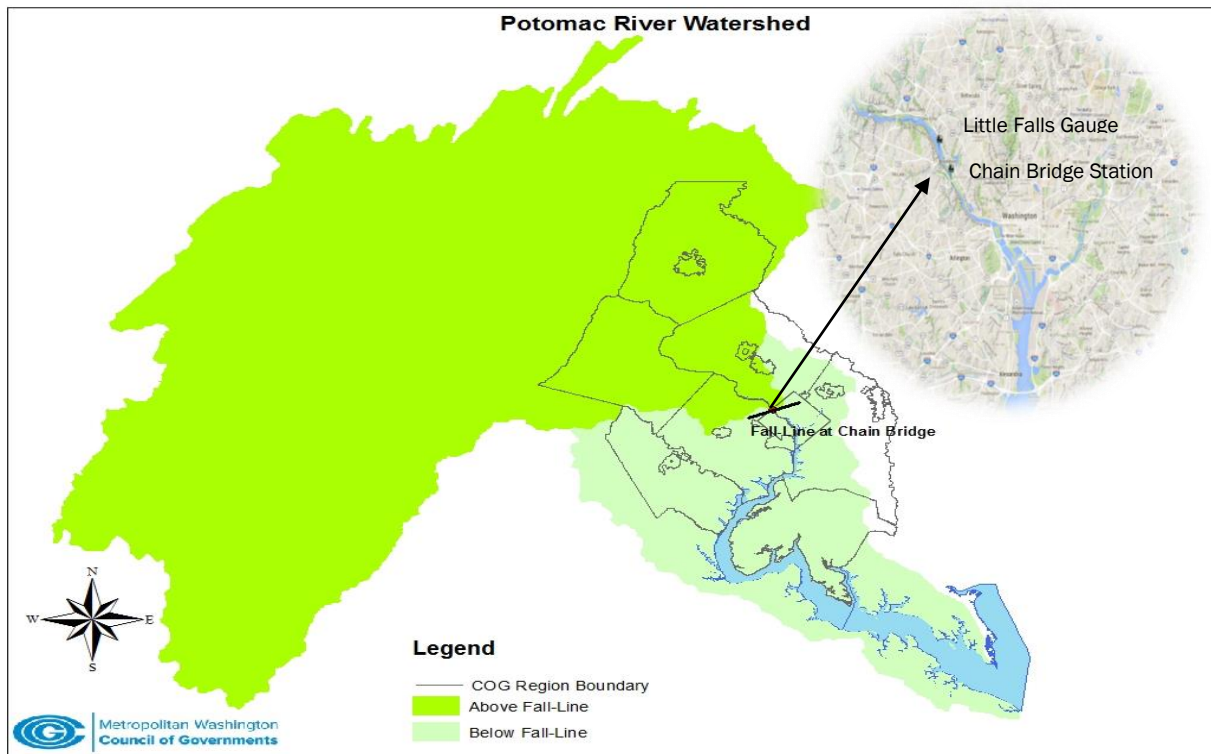
## POTOMAC RIVER WATER QUALITY MONITORING CHAIN BRIDGE MONITORING PROGRAM

### A Historical Dataset for the Region

In 1983, the Metropolitan Washington Council of Governments (COG) established an automated fall line monitoring station at Chain Bridge to measure water quality from upstream sources in the Potomac River into the upper Potomac estuary. The Chain Bridge Monitoring Program was established to provide the region with an independent means of verifying nutrient and sediment loads - parameters that were being evaluated as part of the newly developed Chesapeake Bay Monitoring Program. That Bay effort ultimately led to the issuance of the [Bay TMDL](#) in 2010. Since the fall line designates the transition from the Potomac River's free flowing waters to its tidally influenced section, monitoring at the Chain Bridge location allows for the most complete estimate of upstream nutrient and sediment loads to the upper Potomac estuary, to the middle and lower Potomac River segments, and ultimately to the Chesapeake Bay.

Funding for this program is provided by COG's members, and is conducted by Virginia Tech's Occoquan Watershed Monitoring Laboratory (OWML). OWML staff has operated this monitoring station and data collection effort for the past 33 years. This long-term monitoring commitment has provided the region with the ability to monitor trends, and to compare trend analysis methods with those used by the Bay Partnership.

### Map of the Chain Bridge Monitoring Station and the Little Falls Streamflow Gauge



## Monitoring Program Details

Sampling at the Chain Bridge monitoring station extracts representative samples of the flow at a variety of river stages, ranging from base flows to storm flows (using a flow-weighted composite approach). Sampling occurs at this station because the river channel at Chain Bridge is relatively narrow, and the flow is well mixed because of turbulence. Most of the flow is constricted into a single channel near the Virginia side of the river, making it feasible to retrieve samples collected by an automated sampler. The Chain Bridge monitoring station operates either automatically or with manual-command activation. A telephone-based computer system installed at the USGS's Little Falls gauging station automatically contacts the Chain Bridge monitoring station to activate sampling during storm events.

OWML staff has gathered weekly baseflow samples and composite stormflow samples for nearly every storm since the onset of the program. Since November 1995, OWML staff have also collected discrete samples for a certain number of storm flows each year (up to 25 discrete samples per year). The sampling program also includes a component to measure river flow continuously at the Little Falls gauging station, which is used to pace the composite stormflow sampling. The following parameters are measured at various frequencies throughout the year:

### Water Quality Parameters Measured at the Chain Bridge Monitoring Station

#### Nutrients

- Nitrate and Nitrite Nitrogen, Ammonia Nitrogen Total Kjeldahl Nitrogen, Soluble Kjeldahl
- Nitrogen Total Nitrogen, Total Soluble Nitrogen
- Total Phosphorus, Total Soluble Phosphorus, Soluble Reactive Phosphorus

#### Other Constituents

- Total Organic Carbon, Dissolved Organic Carbon, Chemical Oxygen Demand
- Total Suspended Solids, Turbidity, Total Hardness
- Fecal Coliform and E. coli
- Soluble Reactive Silica, Total Alkalinity
- Dissolved Oxygen, pH, Conductivity, Temperature

## Related Potomac River Monitoring

COG's Chain Bridge monitoring program is independent of the nine non-tidal monitoring network stations maintained by the U. S. Geological Survey that provide the pollutant load estimates used to calibrate the Chesapeake Bay Program's watershed model (see [USGS RIM Stations](#)). The USGS monitoring program collects periodic grab samples and estimates loads using regression techniques, a different approach than the load estimation method used by OWML at Chain Bridge.

## Next Steps

COG's Chain Bridge Monitoring program has provided an independent and long-term check on the accuracy of the Bay Program's monitoring results and trends at the Potomac fall line, as well as different data sets to analyze the relationship between pollutant loads and water quality in the Potomac estuary. COG staff is in the process of analyzing these different data sets and load estimation methods, is holding a workshop on June 7<sup>th</sup> to present some initial results, and will share the results via an online report in the summer of 2016. COG staff will also be evaluating the overall monitoring program (e.g., sampling schemes and parameters) to ensure that this monitoring program addresses the suite of water quality challenges facing the region over the coming decades (e.g., Potomac River water quality, ongoing Bay TMDL efforts, and source water protection needs).

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