

[USGS Maryland-Delaware-District of Columbia Water Science Center](#)  
[Seminar Series](#)

**Wednesday, January 28, 2015 11:00 a.m.**

**Investigating the use of acoustic Doppler meters to estimate concentrations of suspended sediment and nutrients in Rock Creek, near Washington D.C.**

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Concentrations of suspended sediment and nutrients observed in Rock Creek at Joyce Road, near Washington D.C. (USGS Monitoring Station 01648010) exhibit hysteretic relations with streamflow, in that hysteresis is typically observed over the rising and falling limbs of a storm hydrograph. This effect increases the variability of regression estimates of continuous suspended sediment and nutrient concentrations over interpolated periods when discrete samples are not collected. To provide more accurate estimates of suspended sediment and nutrient concentrations and loads overall, surrogates for parameters other than stream discharge are used in estimate computation. For example, turbidity—a measure of water clarity and fine suspended material—is successfully used as a surrogate for suspended sediment and nutrient concentrations. However, turbidity probes are susceptible to biological and physical fouling, particularly during storm events, resulting in an obstructed optical field and loss of data accuracy. Additionally, probes are only capable of collecting data from a single point location, which may not be representative of



the stream cross-section. Acoustic Doppler meters operate on the principles of sound, measuring velocity and backscatter of suspended particles in the water column, making these instruments less susceptible to physical and biological fouling. When compared to other surrogate technologies, acoustic Doppler meters are capable of measuring a larger sampling volume, which results in a more robust surrogate, and thus more representative estimates of continuous concentrations of suspended sediment and nutrients. In October 2014, the USGS began collecting velocity and backscatter data from two acoustic Doppler velocity meters deployed at the Rock Creek station at Joyce Road, to use as a surrogate for concentrations of suspended sediment and nutrients. The use of multiple acoustic frequencies at 3000 and 1500 kHz are being explored to provide information on sediment size distributions.

*This presentation will also be available remotely via Webex: <https://usqs.webex.com/>*

For directions to the USGS MD-DE-DC WSC: <http://md.water.usgs.gov/directions/baltimore.html>.