**Continuous Monitoring Test Site – University Park, PA**

As part of our LTAR activities, University Park has established a test site for evaluating continuous water quality monitoring instruments. This document describes how we collect frequent samples for standard laboratory analysis to serve as the “true” measure of water quality against which data from water quality sensors can be evaluated. It further describes instruments that are currently being tested and are slated for testing in the near future.

**We invite others to test any instrumentation that you already have or consider acquiring continuous water quality monitoring instrumentation for testing and deployment in your own watersheds.**

At the “WE-38” subcatchment of our long-term Mahantango watershed, we have a weir and a gauge house which is monitoring the stage height at 5 minute intervals and we have deployed 3 Sigma samplers programmed as follows:

Sigma 1: storm sampling based on a time dependant (first sampling is triggered with a 0.5 inch increase in stage height and samples once every half hour until the unit has filled all 24 bottles).

Sigma 2: base sampling which consists of samples taken every 4 hours.

Sigma 3: Storm sampling based on a flow dependant (samples are taken if flow increases or decreases by 0.5 inches).

These sigma samples are sent to the laboratory within 5 days for analysis by ion chromatography and ICP.

As of now we have an instrument deployed by the Sutron company <http://www.sutron.com/> which consists of:

a Cycle P (for colorimetric analysis of ortho phosphate) a SUNA optical nitrate sensor a WQM which measures Conductivity, Temperature, Salinity, Dissolved O2, O2 saturation, Chlorophyll A and Turbidity. This instrument also includes an air temperature monitor and communications that update the data stream hourly. This system can run for about 30 days at 1 sample per hour intervals before maintenance is needed.

Kyle Elkin, a postdoc here at University Park, has developed a field deployable Ion Chromatography unit that is set to monitor Nitrate, Chloride, Sulfate, Nitrite, and Phosphate at 15 minute or greater intervals. Depending on the frequency of the measurements, the system can operate for 14-60 days without maintenance. This instrument can be paired with other off-the-shelf instruments to measure pH, turbidity, EC, or other parameters of concern.

Greg McCarty, Beltsville, has an S-CAN spectrolyser probe instrument that measures the spectrum from 200 to 700 nm (2.5 nm increments). This probe has calibrations for turbidity, nitrate, dissolved organic carbon (DOC) and total organic carbon (TOC). A conductivity sensor will also be included in the instrument package. Stream water samples will be analyzed every 30 minutes. This instrument will be deployed for testing this fall.

All of the detection limits for the instruments are at about what is expected from laboratory instrumentation.

Let me know if you would like to test other instruments or would like any more information.

Ray

Dr. Ray B. Bryant, Research Soil Scientist

USDA - Agricultural Research Service

Pasture Systems and Watershed Mgmt Research Unit

Building 3702; Curtin Road

University Park, PA 16802-3702

Office:  (814) 863-0923

Mobile: (814) 280-2152

Fax:      (814) 863-0935

Email: [Ray.Bryant@ars.usda.gov](mailto:Ray.Bryant@ars.usda.gov)