

## **COLLECTION AND ANALYSIS**

### **Sample Collection**

Samples were collected to measure nutrient and SS concentrations during various flows during 2004. For group A sites, two samples were collected per month; one near the twelfth of the month and one during monthly base flow conditions. Additionally, a minimum of four high flow events were sampled, targeting one per season. When possible, a second high flow event was sampled in accordance with spring planting in the basin. During high flow sampling events, samples were collected daily during the rise and fall of the hydrograph. The goal was to gather a minimum of three samples on the rise and three samples on the fall with one sample as close to peak flow as possible. Sampling continued until flows returned to pre-storm levels.

For group B sites, sampling started in October of 2004. Fixed date monthly samples were collected during the middle of each month for the last quarter of 2004. All samples were collected by hand with USGS depth integrating samplers. Samples were collected using the same protocol as group A sites. At each site between three and ten depth integrated verticals were collected across the water column and then mixed together to obtain a representative sample of the entire waterbody.

Whole water samples were collected to be analyzed for TN species, TP species, TOC, and SS. For group B sites, SS samples were only collected during storm events. Additionally, filtered samples were collected to analyze for dissolved nitrogen (DN) and dissolved phosphorus (DP) species. All Pennsylvania samples were delivered to the PADEP Laboratory in Harrisburg to be analyzed the following workday. New York samples were sent to Columbia Analytical Services in Rochester NY for analysis the following work day. Suspended sediment concentrations for group A sites were completed at SRBC and group B sites at the USGS sediment laboratory in Kentucky.

### **Sample Analysis**

The results associated with each sample include a measurement for stream discharge, lab measurements of nutrients and sediment, and physical field measurements.

An instantaneous discharge measurement at a U.S. Geological Survey gaging station at or near the sample collection location is associated with each sample. A stage or gage height is converted to flow and expressed in units of cubic feet per second (cfs).

The nutrient and sediment parameters monitored at all sites are reported in milligrams per liter (mg/l). These parameters included:

| Parameter                     | Laboratory | Methodology                    | Detection Limit (mg/l) | References                                 |
|-------------------------------|------------|--------------------------------|------------------------|--|
| Ammonia (total)               | PADEP      | Colorimetry                    | 0.020                  | USEPA 350.1                                |
|                               | CAS*       |                                | 0.050                  |  |
| Ammonia (dissolved)           | PADEP      | Block Digest, Colorimetry      | 0.020                  | USEPA 350.1                                |
|                               | CAS*       |                                | 0.050                  |  |
| Nitrogen (total)              | PADEP      | Persulfate Digestion for TN    | 0.040                  | Standard Methods #4500-N <sub>org</sub> -D |
| Nitrogen (dissolved)          | PADEP      | Persulfate Digestion           | 0.040                  | Standard Methods #4500-N <sub>org</sub> -D |
| Kjeldahl Nitrogen (total)     | CAS*       | Block Digest, Flow Injection   | 0.050                  | USEPA 351.2                                |
| Kjeldahl Nitrogen (dissolved) | CAS*       | Block Digest, Flow Injection   | 0.050                  | USEPA 351.2                                |
| Nitrite plus Nitrate (total)  | PADEP      | Cd-reduction, Colorimetry      | 0.010                  | USEPA 353.2                                |
|                               | CAS*       | Colorimetric by LACHAT         | 0.002                  |  |
| Nitrite plus Nitrate (diss)   | PADEP      | Cd-reduction, Colorimetry      | 0.010                  | USEPA 353.2                                |
|                               | CAS*       | Colorimetric by LACHAT         | 0.002                  |  |
| Orthophosphate (dissolved)    | PADEP      | Colorimetry                    | 0.002                  | USEPA 365.1                                |
|                               | CAS*       | Colorimetric Determination     | 0.002                  |  |
| Phosphorus (dissolved)        | PADEP      | Block Digest, Colorimetry      | 0.010                  | USEPA 365.1                                |
|                               | CAS*       | Colorimetric Determination     | 0.002                  |  |
| Phosphorus (total)            | PADEP      | Persulfate Digest, Colorimetry | 0.010                  | USEPA 365.1                                |
|                               | CAS*       | Colorimetric Determination     | 0.002                  |  |
| Organic Carbon (total)        | PADEP      | Combustion/Oxidation           | 0.50                   | SM 5310D                                   |
|                               | CAS*       | Chemical Oxidation             | 0.05                   |  |
| Suspended Sediment (total)    | SRBC       | **                             |                        |  |
| Suspended Sediment (total)    | USGS       | **                             |                        |  |

\* Columbia Analytical Services, Rochester, NY (New York sites only)

\*\* TWRI Book 3, Chapter C2 and Book 5, Chapter C1, Laboratory Theory and Methods for Sediment Analysis (Guy and others 1969)

Prior to May of 1995, Total and Dissolved Kjeldahl nitrogen were analyzed and Total and Dissolved Nitrogen were calculated by adding Total Kjeldahl Nitrogen (TKN) to Total Nitrate + Nitrite and Dissolved Kjeldahl Nitrogen (DKN) to Dissolved Nitrate + Nitrite. All New York samples are analyzed for TKN and DKN.

The field measured parameters include water temperature (in Celsius), pH, specific conductivity, and dissolved oxygen. Water temperature and dissolved oxygen are not reported for samples collected by an automatic sampler.