

USGS Field Operation Plan: Tributary Monitoring

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Samples for organic analyses will consist of a composite sample obtained using USGS quarter-point sampling procedures. The stream will be visually divided into three equal flow areas using field data obtained during discharge calibration measurements. At the center of each flow area, water samples will be obtained at 0.2 and 0.8 times the depth. Water samples from each of the six sampling locations will be composited. Water for PCB, PAH, pesticide, and Atrazine analyses will be pumped by a submersible pump through a tee in the pump line. A peristaltic pump will draw water from the tee and pump water through the 293 mm, stainless steel, pentaplate filter holder. Two to five glass fiber filters will be used depending on the concentration of suspended material in the water column. The backpressure from the filter head shall not exceed 5 psi. Residual water will be evacuated from the filter head using the peristaltic pump. Filters from the pentaplate filter holders will be folded in quarters and wrapped in clean, acetone rinsed aluminum foil. The filtrate will be collected in clean, acetone-rinsed, 20 liter glass carboys. The filtrate will be processed through a large, 250 gram, XAD-2 resin column, at a flow rate between 500 and 1000 mL per minute. Water for DOC, POC, and conventional constituents will be obtained from an overflow line attached to the tee from the submersible pump tubing and composited from each of the six sampling locations into a polyethylene churn splitter. The churn splitter provides for efficient subsampling of the composite sample to provide the necessary samples required by the Wisconsin State Lab of Hygiene.

Preprinted, site-specific, laboratory request forms will have the date, time, and sequential sample number recorded for each sample. Filters, resin columns, and sample bottles will have an adhesive label attached which will identify the site, sample number, date and time of sampling. Processed samples will be kept in a chilled ice chest until refrigerated at the USGS. Samples and laboratory request forms will be delivered to the WSLH, chilled, in plastic coolers, by either the USGS or Federal Express. The WSLH will log the receipt of the samples into its Laboratory Information Management System (LIMS) database and sign the chain of custody on the laboratory request form.

The constituent list for which a contract laboratory will perform analyses is as follows:

Constituent Field Requirement

Total Phosphorus Total Kjeldhal Nitrogen Total Ammonia Nitrogen Nitrate Nitrogen	250 mL nutrient bottle preserved with sulfuric acid to pH <2.0
Dissolved Reactive Phosphorus	60 mL, filtered/.45 µm membrane, chilled
Dissolved Chloride Dissolved Silica	60 mL, filtered/.45 µm membrane, chilled

Constituent Field Requirement (con't)

Total Alkalinity Total Suspended Solids Volatile Suspended Solids Conductivity pH	710 mL, no preservative chilled
<i>Dissolved</i> ???? Dissolved Calcium Dissolved Sodium Dissolved Potassium Hardness as CaCO ₃	125 mL filtered/0.45 μ membrane filter in (250 mL) nutrient bottle (unacidified) (write “ff” on bottle cap)
Chlorophyll-a	200 to 1000 mL, filtered using 5.0 μm glass fiber filter retained in glass vial and chilled
Dissolved Organic Carbon Total Organic Carbon	25 to 50 mL filtered until filter clogs. Use syringe.

A variety of field parameters will be measured during the actual sample collection. A Hydrolab multiparameter meter will be used to measure temperature, conductivity, dissolved oxygen, and pH. A light extinction measurement will be made using standard Secchi disc equipment and techniques. Velocity and direction of flow will be recorded at each of the subsampling locations.

Field Operation

The procedure to be followed while obtaining water samples and field parameters will be as follows:

1. At each of the proposed sampling locations a cross section of the stream will be measured. The data will be used to subdivide the cross section into three approximately equal flow cells. The centroid of each of these cells will be identified on the field map.
2. The field crews will use visual reference points to position themselves on station during each sampling trip.
3. At each of the cell centroids water samples and Hydrolab parameters will be obtained at 0.2 and 0.8 times the total depth. Samples are to be taken during periods of downstream flow with the additional limitation that downstream flow must be established for a least ½ hour prior to sample initiation. Data from the AVM gaging stations or field determinations of velocity will be used to determine the proper sampling periods.

4. Water samples from each of the six centroid sampling locations will be composited in order to reduce analytical costs. Therefore the field crew will obtain 1/6 of the total required volume for organic and inorganic analyses at each of the subsampling locations. The flow rate through the 293 mm organics filter will be monitored to maintain an effective subsampling of the cross section. The 293 mm filters will be retained for particulate PCB analyses. The filtered sample will be stored in a 20 L glass carboys and transported to shore for soluble PCB extraction. Water samples for inorganic analyses will be taken from a tee in tubing between the peristaltic pump and the 293 mm filter holder. A 47 mm stainless steel filter holder will be used for dissolved inorganic constituent sample collection. The filtrate will be processed through a large, 250 g, XAD-2 resin column, at a flow rate between 500 and 1000 mL per minute.
5. Secchi disk observations will be taken at the cell centroid locations for each cross section.
6. Velocity and flow direction will be recorded at each of the subsampling locations.
7. Preprinted adhesive labels shall be affixed to each sample container which will be delivered to the analytical laboratory. Sample log forms will be completed and included with the sample containers. An itemized list will be included with each shipment of samples to the labs. A copy of the memo should be noted with the date received and returned to the USGS to preserve a chain of custody for the samples. Samples delivered to contract laboratories which will be hand carried must have drop-off date and time recorded in the Sample Log.