Standard Operating Procedure 7: Water Chemistry Sampling, version 1.0

Overview

All water chemistry sampling associated with the macroinvertebrate monitoring program is conducted with Hydrolab® multiparameter water chemistry monitoring units. These units provide rapid and accurate measures of water temperature, pH, conductivity, dissolved oxygen, and total dissolved solids. Hydrolab multi-parameter units have five primary components including the multi-sensor unit, data display system, cable, water storage cup, and weighted sensor guard. These units have proven to be rugged and highly reliable in the park's backcountry where many of the water chemistry measurements are taken. The units are also easy to calibrate and once calibrated, maintain calibration consistency for up to ten days following. Nevertheless, to ensure data quality, the units are calibrated at the beginning of each week during the field season. Procedures for calibrating the units are listed in SOP 6. Equipment manuals can be found in the "Lower NCR" wet lab below the calibration counter. Two complete units are maintained at SHEN so a spare is always available if one unit is not functional.

Hydrolab measurements should be taken prior to any of the other monitoring activities at the site that involve personnel in the stream. When placing the unit, take care not to step into the stream in the vicinity of the unit or otherwise disturbing the streambed. These considerations will help protect the unit from potential wading damage and are necessary to capture the natural water chemistry measurements at each site prior to the disturbances that follow sampling events. Multiple data entry lines for water chemistry can be found on the field form. These additional lines can be utilized if a tributary in the transect, or upstream and downstream of the tributary junction (or all three) is measured. This is not done routinely.

Required equipment for this task include Hydrolab #4 or #5, the cable, display unit, protective flow thru cover or weight, and data sheet.

Hydrolab Use

The following sequence should be followed when using the Hydrolab in the field:

1. Confirm that the unit has been calibrated within the last week (see SOP on hydrolab calibration).
2. Transport all unit components to a secure location adjacent to the intended sampling point.
3. Remove the two pin covers (rubber plugs) and secure in a safe location.
4. Remove water storage cup and replace with weighted sensor guard (Store the water storage cup in a safe location where it will not be spilled).
5. Attach cable to data display system.
6. Attach opposite end of cable to the multi-sensor unit.
7. Always place the multi-sensor unit in a riffle (portion of stream with surface turbulence and greater than zero gradient) of sufficient depth to completely cover the sensors and make sure that the sensors face upstream.
8. Turn on the data display system.

9. Wait three to five minutes prior to recording data on the data sheets. Record the unit used, current time, water temperature, pH, conductivity, dissolved oxygen, and total dissolved solids
10. Turn unit off and detach cable.
11. Reconnect the two rubber plugs and coil cable on protective spool.
12. Disconnect the weighted sensor guard and replace with full water storage cup.
13. Stow all of the unit components in one of the packs to ensure that nothing is left at the site. The display unit should always be repacked to the top of the pack and never stowed under all of the other gear.

Hydrolab Storage

When not in use, the water storage cup filled with pH4 buffer solution must be securely attached to the unit to protect the sensors from damage and desiccation. To prevent serious damage to the sensors, never store sensors in distilled water. Stream or tap water may be used in the field if pH4 buffer solution is unavailable, but it should be replaced with pH4 buffer solution at the earliest possible convenience back at the lab. Periodic maintenance should be scheduled throughout the year as specified in the operator's manuals to further enhance the service life of the sensors. Cables associated with the Hydrolab also require careful handling and storage and should not kinked or coiled tighter than 12 inch diameter loops. The cable should always be coiled on the spool during transport and storage. To prevent fouling with debris, it is important to keep the two protective pin cover rubber plugs secured in place when the unit is not in use. Obviously, units should always be handled with care.

SOP Revision History

All protocols, regardless of how sound they are originally, require modification as new and different information becomes available. SOP version numbers increase incrementally by tenths (e.g. version 1.1, version 1.2…etc.) for minor changes. Major revisions should be designated with the next whole number (e.g., version 2.0, 3.0, 4.0 …). Small changes or additions to existing methods will be reviewed in-house by Shenandoah or Mid-Atlantic Network staff. However, if a complete change in methods is sought, an outside review is required.

Revision History Log:

Prev. Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #