FS 7220. Qualitative Periphyton Sampling

Adapted from *Stevenson, R. J. and L. L. Bahls. 1999. Periphyton protocols. Pages 6-1 through 6-22 in: M. T. Barbour, J. Gerritsen, and B. D. Snyder, editors. Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition. EPA 841-B-99-002 U. S. Environmental Protection Agency, Office of Water, Washington.*

This sampling procedure requires specific training and a demonstration of competency due to the expert judgment exercised during field sampling. Individuals conducting this procedure must train with FDEP staff (via workshops and/or participating in field sampling) and pass a field performance test. See also the following section: FT 3000 Aquatic Habitat Characterization

Equipment and Supplies

- Disposable pipettes (2 mL)
- Preservative (buffered formalin, Lugol's solution, or M3)
- Permanent marker
- Plastic container with approximate 8-cm inner diameter lid
- Scissors or knife for removing pieces of plants, roots, or snags (optional)
- 50-mL plastic tube to hold final sample
- Completed Physical/Chemical Characterization Field Sheet (FD 9000-3)
- Completed Stream/River Habitat Sketch Sheet (FD 9000-4) or site map
- Completed Habitat Assessment Field Sheet (FD 9000-5 or FD 9000-6)

1. Methods

1.1. Complete the Physical/Chemical Characterization Field Sheet (FD 9000-3), Stream/River Habitat Sketch Sheet (FD 9000-4) or site map, and Habitat Assessment Field Sheet (FD 9000-5 or FD 9000-6) forms appropriate to the water body in which you are sampling (see FT 3000-FT 3400). Visually determine the substrates where algae will be collected within 0.5 m of the surface. Targeted substrates include removable portions of vascular plants or mosses, snags, roots, leaf packs or mats, and rock. All sampled substrates are combined into a single, composite sample for a particular site. For sampling, target substrates in flow and sunlight conditions that are representative of the aquatic system being sampled. If algae are visible on a substrate, preferentially include that substrate for sampling, as opposed to sampling an adjacent substrate of the same type where algae are not visible. A thin film of algae (usually diatoms) may be present on some substrates, but not visible to the naked eye, although this algal film may feel somewhat slimy to the touch. If algae is not visible at a site, sample in areas where algae would be expected to grow (stable, "seasoned" substrates) in the top 0.5 m of the water column, where incident light should be available. Avoid depositional areas or substrates with excessive silt or sand. Do not sample the sediments.

1.2. Collect algae from approximately an 8-cm diameter area from each targeted substrate within a 100 m reach (in a stream) or 100 m diameter (in a wetland). After carefully removing (to avoid loss of algae) a measured amount of

substrate (approximately an 8-cm diameter portion) from the water, place it into a jar containing 100 mL of site water. Using your fingers, rub algae from the substrate into the water, rinsing your fingers in the same jar. Agitate this slurry sufficiently to homogenize the aliquot. Then, using a pipette, transfer 4 mL of the slurry into the 50-mL tube. Collect a total of 10 of these aliquots from points spaced throughout the site, representing a cross-section of the kinds of algae expected to be present. Sample all removable habitats where periphyton growth may be expected, such as snags, roots, leaf packs/mats, vascular plants/mosses, and rock. Apportion the 10 aliquots as equally as possible among productive substrates (as defined by the habitat assessment; see FT3100) according to the following:

1 productive substrate = 10 aliquots

2 productive substrates = 5 aliquots each

3 productive substrates = 4 from most abundant substrate, 3 from each of the remaining substrates

4 productive substrates = 3 from the two most abundant substrates, 2 from each of the remaining substrates

5 productive substrates = 2 aliquots from each substrate

Note: For a targeted substrate consisting of less than 2 m^2, (i.e., not a major productive habitat according to Habitat Assessment SOP FT3100), collect a single periphyton aliquot from that substrate, and follow the above apportioning rule as closely as possible in the remaining major (greater than 2 m^2) habitats.

When collecting each aliquot, it is important to keep the amount of water placed into the jar (100 ml) and the amount of slurry transferred into the tube (4 ml) consistent for all 10 aliquots.

1. Removable hard substrates (snags, rocks): Remove substrate from water and rub algae from an approximately 8- cm diameter area into jar filled with 100 mL of site water. Pipette 4 mL of resulting slurry into sample container. Discard remaining slurry.

1.2.1. Removable soft substrates (plants, mosses, leaf packs, macro-algal mats- if representative of the site, roots): Remove approximately 8-cm diameter area of substrate from water, place into jar containing 100 mL of site water, and rub algae (using fingers) from substrate. Pipette 4 mL of resulting slurry into sample container. Discard remaining slurry. When sampling plants, sample algae from the dominant plant species, including both emergent and submerged varieties.

1.3. Sequentially place all 10 of the 4 mL aliquots from the sampled substrates, as described in Section 2.2, into the 50-mL tube sample container, which should be clearly marked with the permanent marker. Include site, date, collector, sample type (qualitative periphyton), and preservative information.

2. SAMPLE PRESERVATION AND HANDLING

2.1. Add 2 mL of buffered formalin (see FS 7001, section 1) or M3 per 40 mL of periphyton slurry for samples for taxonomic identification.