

# EIM Help – Periphyton Chemistry

Version 1.1

September 2017

## What is Periphyton?

Periphyton is a complex assemblage of microorganisms, including algae and cyanobacteria, intermixed in a matrix of heterotrophic microbes and detritus. Periphyton grows on submerged surfaces in most aquatic ecosystems, often forming slimy coatings.

## Contaminants in Periphyton

Periphyton is sometimes collected and analyzed for contaminants such as metals or organochlorine compounds.

Periphyton is a good indicator of pollution in surface water because of the organisms' ability to uptake or bind contaminants, their relatively short life cycles, the ease with which they can be sampled, and the fact that they are not mobile. Periphyton sampling can be an effective way to assess the spatial distribution of contaminants in a river or stream. The accumulation of contaminants in periphyton also has important implications for organisms feeding upon them, as periphyton forms the base of food webs in many aquatic systems.

Depending on your study objectives, you might also have collected samples for *periphyton areal biomass* (expressed in terms of chlorophyll *a* or ash free dry weight (AFDW)) or *periphyton taxonomic identification and counts*. If so, see the [Areal Biomass for Periphyton and Macrophyte Data](#) and [Periphyton Counts](#) EIM help documents. If you analyzed for other chemicals that are not necessarily contaminants, such as total phosphorus or nitrogen, follow the general guidelines outlined in this document to enter them into EIM.

## Periphyton Sample Collection

Periphyton is scraped into a sample container with a small brush or other implement from underwater surfaces such as rocks, woody debris, or the stream substrate. Stainless steel implements are used when sampling for organochlorine compounds. In some cases, an artificial substrate is placed in the stream and retrieved later for collection of periphyton. If you collected periphyton from different areas of the stream reach and combined them into a single sample container, this is considered a composite sample. Recording the area you scraped can also be important. Area is a useful supplemental piece of data that allows you to compare areal concentrations (e.g., ng/cm<sup>2</sup>) across sample sites.

## How to Enter Periphyton Data into EIM

In addition to EIM’s standard required fields described in the [Result Help](#), use the following guidance for entering your data into the Result Template.

**Field Collection Type (D):** Enter “*Sample*”

**Field Collection Start Time (G) and Field Collection End Time (I):** Time is important for analytes that display diurnal variations, such as metals.

**Field Collection Comment (J):** If your sample was a composite, explain how the sample was composited (e.g., “*Sample is a composite of 8 randomly selected transects in the reach*”). If you recorded your initial sample volume, you can enter it here (optional).

**Field Collection Area (K):** (optional) Enter the surface area of the substrate you scraped to collect your sample (e.g., “352”). If you composited multiple samples into a single sample container, enter the summed area for all the samples.

**Field Collection Area Units (L):** (optional) Enter the units for your Field Activity Area value (e.g., “cm<sup>2</sup>”).

**Sample Composite Flag (V):**

- Enter “**Y**” - If you collected periphyton from different areas of the stream and combined them into a single sample container.
- Enter “**N**” - If you collected periphyton from one general area of the stream (even if periphyton was collected from multiple rocks at that one location).

**Sample Matrix (X):** Enter “*Tissue*”

**Sample Source (Y):** Enter “*Periphyton*”

**Sample Collection Method (AA):** Enter the appropriate method code (table continued on next page):

Sample Collection Method Code	Sample Collection Method Description
<b>PeriphytonCoarse</b>	Periphyton Sampling Method for Epilithic (Course Substrate) Habitats
<b>PeriphytonFine</b>	Periphyton Sampling Method for Epipsammic (Pea gravel/Sand) and Epipellic (Silt) Habitats
<b>PeriphytonCoarseFine</b>	Periphyton Sampling Methods for composite sample containing material collected from Course Substrate + Pea gravel/Sand or Silt Habitats
<b>PeriphytonVeg</b>	Periphyton Sampling Method for Epiphytic (Submerged or Emergent Vegetation) Habitats
<b>PeriphytonCoarseVeg</b>	Periphyton Sampling Methods for composite sample containing material collected from Course Substrate + Emergent Vegetation or Submerged Vegetation Habitats

<b>PeriphytonFineVeg</b>	Periphyton Sampling Methods for composite sample containing material collected from Pea gravel/Sand or Silt Habitats + Emergent Vegetation or Submerged Vegetation Habitats
<b>PeriphytonWoody</b>	Periphyton Sampling Method for Epidendric (Woody Snag) Habitats
<b>PeriphytonMultiple</b>	Periphyton Sampling Methods for composite sample containing material collected from multiple (more than two) kinds of habitats
from Mathieu, et al. (2013) and Adams (2010)	
<b>PeriphytonAS</b>	Periphyton collected by in situ Artificial Substrate Sampler
from Anderson, et al. (2016)	

**Result Parameter Name (AH):** Enter chemical name, such as “Mercury.”

**Result Reported Value (AM):** Enter chemical concentration reported by your lab.

**Result Value Units (AN):** Should be a mass/weight, typically ng/g or pg/g for PCBs and ug/g for metals.

**Result Data Qualifier (AS):** Enter a data qualifier as necessary.

**Result Basis (AV):** Enter “Wet” or “Dry.” Organochlorines are typically reported as wet weight, while metals are typically reported as dry weight. Check with your lab if you are unsure.

**Result Method Code (AY):** Enter the analytical method your lab reported.

## References

Adams, K., 2010. Quality Assurance Monitoring Plan: Ambient Biological Monitoring in Rivers and Streams: Benthic Macroinvertebrates and Periphyton, August 2010, Appendix C-3.

<https://fortress.wa.gov/ecy/publications/documents/1003109.pdf>

Anderson, P.D., N. Mathieu, and S. Collyard, 2016. Standard Operation Procedure (SOP) for Collection and Processing of Periphyton Samples. SOP No. EAP085, V 2.0 DRAFT. WA Department of Ecology, Olympia, WA.

Mathieu, N., S. Collyard, and T. Mohamedali, 2013. Standard Operating Procedure (SOP) for the Collection of Periphyton Samples for TMDL studies. Version 1.1. Washington State Department of Ecology, Olympia, WA. SOP No. EAP085. [www.ecy.wa.gov/programs/eap/quality.html](http://www.ecy.wa.gov/programs/eap/quality.html)

## Document Revision History

Revision Date	Revision No.	Summary of Changes	Reviser(s)
04/27/16	1.0	Original Document	KC, CN
09/13/17	1.1	Updated links	KC