NORTH Dakota | Environmental Quality
Be Legendary.™

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QUALITY CONTROL/QUALITY ASSURANCE DOCUMENTATION

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1.0 SCOPE AND APPLICABILITY

This document presents the North Dakota Department of Environmental Quality, Division of Water Quality's (DWQ) Standard Operating Procedure (SOP) for the Periphyton Sample Collection in North Dakota. This SOP applies to all DWQ field staff, non-DWQ cooperators, and citizen volunteers.

2.0 SUMMARY OF METHOD

Collect periphyton from the 11 cross-section transects ("A" through "K") established within the sampling reach. Collect periphyton samples at the same transect location (L, C, or R) as the benthic macroinvertebrate samples directly after collecting the benthic macroinvertebrate sample. At the completion of sampling activities, but before leaving the site, prepare laboratory samples for ID/enumeration to determine taxonomic composition and relative abundances, from the composite periphyton sample.

3.0 HEALTH AND SAFETY WARNING

Field personnel should be aware that hazardous conditions potentially exist at every waterbody. If unfavorable conditions are present at the time of sampling, the sample visit is recommended to be rescheduled. If hazardous weather conditions arise during sampling, such as lightning or high winds, personnel should cease sampling and move to a safe location.

4.0 CAUTIONS

5.0 INTERFERENCES

6.0 PERSONNEL QUALIFICATIONS/RESPONSIBILITIES

All personnel collecting periphyton samples for biological monitoring must read this SOP annually and acknowledge they have done so via a signature page (see Appendix B). New field personnel must also demonstrate successful performance of the method. The signature page will be signed by both trainee and trainer to confirm that training was successfully completed and that the new monitor is competent in carrying out this SOP. The signature page will be kept on-file at DWQ along with the official hard copy of this SOP.

7.0 EQUIPMENT AND SUPPLIES

_____ Large Funnel (15-20cm diameter)
_____12cm² area delimiter (3.8 cm diameter pipe, 3 cm tall)
_____Stiff-bristle toothbrush with handle bent at 90° angle
_____1 L wash bottle for DI water
_____500mL graduated plastic bottle for the composite sample
_____60mL plastic syringe with tip removed, and length of tubing (20 mL)
_____Timer or stopwatch
_____Cooler (small soft-sided preferred)
_____Wet ice
_____Field Operations Manual and a laminated Quick Reference Guide
_____Sample Collection Form
_____Soft #2 lead pencils for recording data on field forms
_____Fine-tipped indelible markers for filling out sample labels
_____Sample labels with the sample ID Number
_____Clear tape strips for covering labels
_____10% Bleach solution (for cleaning equipment)

8.0 PROCEDURE

Starting with Transect “A”, collect a single sample from the assigned sampling station using the procedure below.

If coarse substrate (cobbles, woody materials, etc.) are present that can be removed from the water:

1. Collect a sample of substrate (rock or wood) that is small enough (< 15 cm diameter) and can be easily removed from the water. Place the substrate in or over a plastic funnel which drains into a 500 mL plastic bottle with volume graduations marked on it.

2. Use the area delimiter to define a 12 cm2 area on the upper surface of the substrate. Dislodge attached periphyton from the substrate within the delimiter into the funnel by brushing with a stiff-bristled toothbrush for 30 seconds. Take care to ensure that the upper surface of the substrate is the surface that is being scrubbed, and that the entire surface within the delimiter is scrubbed.

3. Fill a wash bottle with DI water. Using water from this bottle, wash the dislodged periphyton from the funnel into the 500 mL bottle. Use an amount of water (~45 mL) that brings the composite volume up to the next graduation mark on the bottle.
4. Put the bottle in a cooler on ice while you travel between transects and collect the subsequent samples. (The sample needs to be kept cool and dark because a chlorophyll sample will be filtered from the composite).

If large coarse substrate is present that is too large to remove from the water (bedrock, large woody materials, boulders, etc.):

1. Use the area delimiter to define a 12cm² area on the upper surface of the substrate. Dislodge attached periphyton from the substrate within the delimiter using the clear tube attached to the tip of the syringe in a scraping motion.

2. While dislodging periphyton with the tube, simultaneously pull back to 25mL on the syringe plunger to draw the dislodged periphyton into the syringe. The 25mL in the syringe combined with the 20mL in the tube equals the target volume of 45mL.

3. Empty the syringe and tube into the same 500mL plastic bottle as above. If the volume of the vacuumed sediment is not enough to raise the composite volume to the next

graduation on the bottle (~45mL), add additional stream water to the bottle to raise the level to the next graduation.

4. Put the bottle in a cooler on ice while you travel between transects and collect the subsequent samples. (The sample needs to be kept cool and dark because a chlorophyll sample will be filtered from the composite.)

If no coarse sediment (cobbles or larger) are present:

1. Use the area delimiter to confine a 12cm² area of soft sediments.

2. Vacuum the top 1cm of sediments from within the delimited area into a de-tipped 60mL syringe with attached clear tube up to the 25mL line of the syringe.

3. Empty the syringe into the same 500mL plastic bottle as above. If the volume of the vacuumed sediment is not enough to raise the composite volume to the next graduation on the bottle (~45mL), add additional stream water to the bottle to raise the level to the next graduation.

4. Put the bottle in a cooler on ice while you travel between transects and collect the subsequent samples. (The sample needs to be kept cool and dark because a chlorophyll sample will be filtered from the composite.)

Repeat Step 1 for transects "B" through "K". Place the sample collected at each sampling station into the single 500 mL bottle to produce the composite index sample.

Periphyton ID/Enumeration Samples

1. Prepare a sample label (with site ID number and sample type "Periphyton"). Record the volume of the subsample (typically 50 mL) and the volume of the composite index sample on the label. Attach completed label to a 50 mL centrifuge tube; avoid covering the volume graduations and markings. Cover the label completely with a clear tape strip.

2. Record the sample ID number of the label and the total volume of the composite index sample on the Sample Collection Form.

3. Thoroughly mix the bottle containing the composite sample.

4. Immediately after mixing, pour 50 mL of sample into pre-labeled 50 mL centrifuge tube.

5. Use a syringe or bulb pipette to add 3 ml of Lugol's solution to the tube (EcoAnalysts, Inc. 2021) Cap the tube tightly and seal with plastic electrical tape. Tighten the cap as tightly as possible. The cap will seal tightly after an additional ¼ turn past the point at which initial resistance is met.

9.0 DATA AND RECORDS MANAGEMENT

All data will be recorded on Periphyton field form (Appendix A). Once personnel reach the office, data recorded on the field form are entered into the DWQ Ecological Data Application System Database (EDAS). Field notes should be used to record any quality control activity performed such as measurements taken by more than one sampler, or to record any sampling conditions that may have interfered with the data collected. Field forms and notes should be stored in the appropriate project folder at DWQ.

10.0 QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance and quality control are verified by revisiting a minimum of 2 sites each sampling year. The revisit sites will require a two week break between original site sample. The re-sampling will identify the range of variance associated with the method of sampling and analysis employed.

11.0 REFERENCES

EcoAnalysts, Inc. (2021). Sample Collection and Preservation. https://www.ecoanalysts.com/sample-collection-and-preservation?rq=Periphyton%20Samples

National Rivers and Streams Assessment 2018/19: Field Operations Manual EPA-841-B-17-003a

APPENDIX A

Periphyton Field Form

NORTH Dakota Be Legendary.™ | Environmental Quality

Biological Monitoring Site Form

Division of Water Quality
Watershed Management Program
Phone: 701-328-5210 Fax: 701-328-5200

SITE ID: _____ **DATE:** _____ / _____ / _____

FIELD NUMBER_____ **SAMPLERS:** _____

STATION DESCRIPTION: _____

_____

LATITUDE: _____ **LONGITUDE:** _____

ECOREGION (circle one)**:** 43 42 46 48

INVERTEBRATE COLLECTION METHOD (circle one): D-NET OTHER _____

REACH LENGTH: _____ **meters**

FIELD WATER CHEMISTRY	**SITE PHOTOS**
TEMP:	UPSTREAM:
DO:	DOWNSTREAM:
pH:	Periphyton Collection:
COND:	

WEATHER CONDITIONS (Temp., Wind, etc.):

_____

_____

_____

COMMENTS:

_____

_____

_____

_____

09/23/2020

Checked by: _____ Date: _____

SITE DRAWING (Show direction of water flow and north)

COMMENTS:

09/23/2020

Checked by: _____ Date: _____

APPENDIX B

SOP Acknowledgement and Training Form

Checked by: _____ Date: _____

SOP Acknowledgement and Training Form

This SOP must be read, and this form signed annually. This form must be kept with the latest version of the SOP.

Document Title:	
Document Revision Number:	
Document Revision Date:	

Please sign below in accordance with the following statement:
"I have read and understand the above referenced document. I agree to perform the procedures described in this SOP in accordance with the document until such time that it is superseded by a more recent approved revision."

Printed Name	Signature	Date

09/23/2020

Checked by: _____ Date: _____

SOP Acknowledgement and Training Form (con't)

Trainee: Sign below to acknowledge that training on this SOP was received, understood, and all questions/concerns were addressed by the trainer.

Trainer: Sign below to acknowledge that training on this SOP was completed for the individual listed and that training is competent to perform the procedures described within.

Date of Training	Trainee Printed Name	Trainee Signature	Trainer Printed Name	Trainer Signature

Checked by: _____ Date: _____