ACADEMY OF NATURAL SCIENCES OF DREXEL UNIVERSITY
PATRICK CENTER FOR ENVIRONMENTAL RESEARCH

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IDENTIFICATION AND ENUMERATION OF MACROALGAE

Prepared by: Laura Aycock and Frank Acker

Identification and Enumeration of Macroalgae

1. **PURPOSE**

1.1. This procedure describes the methods or identification and enumeration of macroalgae.

1.2. This method is qualitative and designed to provide an abundance ranking for each macroalgae species within a sample.

2. **SCOPE**

2.1. This protocol is applicable to the analysis of the macroalgae. It includes procedures for identification (to lowest possible taxon level) and assigning abundance rankings

2.2. Personnel responsible for these procedures include sample preparers and algal analysts.

3. **REFERENCES**

3.1. Parker, S. 2016. AOS Protocol and Procedure: Aquatic Plant, Bryophyte, Lichen and Macroalgae. Document No. NEON.DOC.003039

3.2. Stancheva, R., L. Busse, J.P. Kociolek, and R.G. Sheath. 2015. Standard Operating Procedures for Laboratory Processing, Identification, and Enumeration of Stream Algae. Document No. SWAMP-SOP-2015-0003

4. **DEFINITIONS**

4.1. **Macroalgae**- Photosynthetic algae that is visible to the naked eye; includes multicellular, filamentous or colonial algae that are in a large enough abundance to be seen by the naked eye.

5. **APPARATUS/EQUIPMENT**

5.1. Compound microscope with 10-15x, 40-50x and 90-100x objectives.

5.2. Dissection Scope

5.3. Forceps

5.4. Weighing trays or petri dishes.

5.5. Pipettes

5.6. Glass vials

5.7. Distilled (DW) or reverse osmosis (RO) water.

5.8. Small plant press (8-10inches by 4-6inches) with blotters, cardboards, and wax paper.

5.9. 100% cotton paper cut to the size of the plant press.

6. METHODS

6.1. Obtain macroalgae sample and inspect for any visible macroalgae. If no macroalgae is present, record in notes.

6.2. If the macroalgae sample has not been preserved, process within two-weeks.

6.3. Use forceps to remove macroalgae from the sample bottle and place in a petri dish or dissecting tray. Using a dissecting scope and forceps, separate and organize the macroalgae into different visible forms. Take notes on colonial forms, size, shape, color, etc.

6.4. Separate a small portion from each of the different form to create slides. If no macroalgae is visible in the sample, use a pipette to create slides from the sample. Use a compound microscope to aid in further identification of macroalgae taxa. Look for any distinctive characteristics or reproductive features that would aid in identification. Identify all visible forms to the lowest possible taxonomic level. Take notes on colony size and shape, heterocyst and akinete formation, reproductive cells, etc. Only identify large filamentous or plant-like macroalgae. If there is a large abundance of microalgae, include in count notes.

6.5. Using the dissecting scope assign an abundance rating to each taxa. Use the table below as guidance.

Abundance Rating		Definition
1	Rare	Species only observed once or twice in the sample.
2	Frequent	Species observed as a few small clumps or clusters but not seen in the majority of the sample
3	Common	Species observed in many small clumps or clusters and seen in the majority of the sample
4	Very Common	Species observed in large clumps or clusters and seen in the majority of the sample
5	Abundant	Species is dominate however overall macroalgae community isn't extremely large
6	Very Abundant	Species dominates a very large macroalgae community

6.6. Enter identifications and subjective rating into computer format by computer applications (eg., ANS developed "Tabulator" application) or spreadsheets.

6.7. Take high-quality images of each species with an embedded scale bar. Save images as a TIF.

6.8. Obtain the sample and glass vial. Remove a portion of the filamentous algae from the sample and place in the glass vial. Label the glass vial and lid with the sample ID.

6.9. If the macroalgae sample was not preserved, make a herbarium mount. The herbarium mount is made by separating the macroalgae from as much dirt and detritus as possible. "Washing" the macroalgae can be done by placing in a petri dish with DW or RO water. Take the wet, but not dripping wet macroalgae and spread on the cotton paper. Mark the paper sheet with sample and taxa name identifiers. Place in plant press covered by wax paper and the usual arrangement of blotters and cardboards.