

STANDARD OPERATING PROCEDURE (SOP)

Procedures for the collection and processing of qualitative aquatic macroinvertebrate kicknet samples

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Approved by: _____ Date: _____

Effective Date: 25 September 2003

1.0 PURPOSE

The purpose of this SOP is to document the appropriate procedures for collecting a kicknet sample for benthic macroinvertebrates in a stream following the rapid bioassessment protocol developed by the Environmental Protection Agency (EPA). This SOP also describes the fate of the sample once it has been collected and returned to the laboratory.

2.0 SCOPE AND APPLICABILITY

This procedure is only for use during macroinvertebrate sampling efforts which use a kicknet. Collection of macroinvertebrate samples by other methods, such as a Surber sampler, may require additional considerations and sample handling. This procedure also assumes that initial processing of the kicknet sample will take place in the field rather than back at the laboratory. If the entire sample is collected and returned to the laboratory, additional equipment, time and procedures may be required and are not discussed in this document.

3.0 METHOD OR PROCEDURAL SUMMARY

At the stream site, select a riffle area to kicknet sample. For at least 5 minutes, kick at the substrate in a zip-zag pattern across the length of the riffle from downstream to upstream. Transfer sample to a clean sorting tray. Pick the first 100 organisms observed and place in vial with 70% ethyl alcohol. Log sample in at the lab. Identify organisms to lowest taxonomic level possible. Keep entire sample or voucher specimens.

4.0 LIMITATIONS

Sampling at a selected stream site might be limited by the availability of an appropriate riffle habitat. It may be acceptable to sample a run or a glide, but procedures for such collection are

not covered by this document. Sampling may also be limited by weather conditions and accessibility of the stream.

5.0 SAFETY

5.1 Field Safety: Field work requires an awareness of potential hazards and common sense. Be aware of changing weather conditions. Do not go sampling in the field alone. File a trip itinerary with an advisor or colleague which lists the trip participants, sampling sites, and the departure and return times. Carry basic safety equipment such as a first aid kit, flashlight, and rain gear.

5.2 Laboratory Safety: Basic laboratory safety procedures apply. Be familiar with the chemical hygiene plan for the laboratory and the University's policies on laboratory safety.

6.0 EQUIPMENT (AND REAGENTS)

6.1 Field Sampling Equipment

- D-frame kicknet
- Boots or waders
- Sorting tray/pan
- Forceps
- Eyedropper
- Vials
- 70% ethyl alcohol
- paper and pencil for site-specific labeling

6.2 Laboratory Equipment (includes all equipment listed under field equipment)

- Dissecting microscope
- Petri dishes
- Compound microscope and supplies (slides, cover slips, CMC-10 mounting media, immersion oil)
- Taxonomic keys
- printed labels and/or label paper and permanent ink pen

7.0 PROCEDURES

- 7.1 Assemble needed sampling equipment and travel to stream sampling site. Arrive at sampling location and verify that needed equipment is present and intact.
- 7.2 Scout out location of appropriate riffle habitat for sampling. An appropriate riffle covers at least one-half of the stream width and is twice as long as the stream width.
- 7.3 Starting at the downstream end of the riffle, place the kicknet downstream of the person doing the kick, with the opening facing upstream. Begin disturbing the substrate and keep the net positioned such that detritus and organisms flow downstream into the net. Work to disturb the substrate in the riffle in a zig-zag fashion from downstream to upstream, covering as much of the width of the riffle as possible. Continue in this fashion for at least 5 minutes.
- 7.4 Thoroughly rinse the sample in stream to dislodge any silt or small particles in the sample. Transfer the sample to a white sorting pan. Rinse the inside of the net with a small amount of water to remove remaining detritus and organisms.
- 7.5 Add a small amount of water to the sample in the pan to allow organisms to move around. Shake the pan laterally to evenly distribute the detritus over the pan. *Note:* If a subsampling protocol is desired, randomly place a subsampling square of known area into the pan. Remove the contents of the square to a separate pan and continue to the next step.
- 7.6 Using forceps, pick out the first 100 macroinvertebrate organisms that are seen. As organisms are removed from the pan, place them in a vial containing 70% ethyl alcohol. If possible avoid placing large amounts of detritus in the vial. If particularly large organisms are collected, it may be advisable to place larger organisms in a separate vial; be sure to label appropriately, however.
- 7.7 Label the sample vial by inserting a paper label and by writing the sample information on the lid of the vial. The paper label must be written with pencil or permanent (non-soluble) ink and include the following information: date, sampling site information, type of sample (5-min kick), and name of collector(s). Make sure that the sample vial is securely closed.
- 7.8 Upon return to the laboratory, log in samples to a permanently bound notebook. Include all information written on the sample label and any additional notes about the sampling event.
- 7.9 Identify the organisms in each sample vial to the lowest taxonomic level possible using a dissecting microscope. Some organisms, such as chironomids, may require the use of a

compound microscope

- 7.10 In a laboratory notebook, write down the sample information, then list the name of each organism identified and the number of each organism present in the sample as it is identified. Hatch marks may be used to indicate number of organisms. The organism identification list should include class, family, genus and species, depending on the level to which the organism was identified. Document the taxonomic keys used in the course of identification on the data sheet.
- 7.11 If the organisms in a sample are to be stored in separate vials by lowest level of identification, include all appropriate labels, including sample and identification determination information.

8.0 CALCULATIONS

No calculations are required for these procedures.

9.0 QUALITY CONTROL

To avoid cross-contamination between sites, all sampling equipment (including kicknets, sorting trays, and boots) must be thoroughly rinsed between sampling locations.

Sample labels should be properly completed and include the date, stream name sample location, collector's name, and sample identification number (if available). Labels must be placed inside the sample container. Additionally, sample information may be written on the outside of the container.

Depending on the study design, quality assurance sampling may be built into the procedures by the collection of multiple samples from the same kicknet effort. These replicates should be collected and processed in the same manner as the initial samples.

Because taxonomic identification can sometimes be a subjective process, have an outside expert verify the determinations of a certain percentage (usually 10%) of the identified organisms.

10.0 DEFINITIONS

Benthic macroinvertebrate – organisms without backbones (invertebrates) which live on the bottom substrate of a water body (benthic) and which can be seen with the naked eye (macro)

Bioassessment – or biological assessment, the evaluation of the condition of a water body using biological surveys of the resident biota in surface waters

EPA – Environmental Protection Agency

11.0 REFERENCES

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