BES 316 Spring 2010

**STREAM MACROINVERTEBRATE SAMPLING:**

**INDICATORS OF STREAM QUALITY**

**Goals for Today**

1. To learn about stream benthic macrobinvertebrates and methods of sampling them.

***SCHEDULE for MAY 18, 2010***

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| **Time Period** | **Activity** |
| 11:00 – 1:05 | Sampling benthic macroinvertebrates in North Creek |

**SPECIAL NOTES FOR TODAY**

* **EXPECT TO GET REALLY, REALLY WET AND MUDDY**
* **We will supply waders (which may leak), but come with any other gear to reduce your getting wet. Bring a dry set of clothes to change into at the end of class. You will go into the stream and rummage around in the sediment… you will be SOAKED by the end!**
* **Bring a field notebook for recording notes in any kind of weather**
* **Consider bringing a digital camera to record conditions of the stream or the sampling procedures. Photos will be handy for your oral presentations.**

**Overview**

Benthic macroinvertebrates (BMIs) are important components of stream ecosystems. Many BMIs are sensitive to the physical, chemical, and biological conditions of the stream environment but the degree of sensitivity to specific environmental factors varies among different BMI taxa. Thus, BMIs are often used as indicator species of certain stream environment conditions. Scientists have developed indices of stream quality based on the types, diversity, and relative abundance of BMIs found in a site. Beyond learning about the BMIs and their sampling techniques, we will use the samples collected from North Creek today to assess stream health in our wetland as compared to that of Little Bear Creek in Woodinville. On Thursday, we will provide you with samples of BMIs that were collected recently from Little Bear Creek.

Today we will collect BMI samples from two North Creek sites in the wetland restoration project: (1) just downstream and (2) just upstream from the platform at the end of the boardwalk. One group of four students will work in each North Creek site. Within your group of four, you will work in two pairs, with each pair gathering a subsample of BMIs. The two subsamples in each location will be pooled in the field to create one sample per North Creek site. After we complete our sampling, we’ll bring the samples into the lab and place them into ethyl alcohol to preserve the BMIs for sorting on Thursday (without such preservation the predators in the samples would devour many others and not allow an accurate count of different taxa). Our impact on stream BMIs will be minimal, as populations recover very rapidly from such isolated sampling events.

**Equipment each group (of 4 students) should take out to the field**

* Hip waders and gloves for each student
* 2 D-frame nets
* 2 Buckets and 2 wash bottles
* 2 sets of nested sieves
* 2 Weeding tools
* 2 Metersticks
* 2 Guides to stream macroinvertebrates
* 2 pair of tweezers

**FIELD LOGISTICS / PROCEDURES**

We will meet in the classroom at 11:00 promptly, grab our gear (above), and head out to the wetland. We will divide into two groups of four students each. One group will work under the direction of Amy Baum and Maizy Brown (UWB students from last year’s BES 316 class), while the other group will work under my instruction.

1. On arriving at each site, your first task will be to describe the stream, streambed, and the bank environment. Photos might also be helpful for reporting on site conditions later, or for refreshing your memories. For our sampling, we will concentrate on a riffle environment with a cobbly streambed (in all locations to be compared). We will not sample other stream environments, such as pools, and thus we will obtain a limited description of BMIs in the stream broadly. We do not have sufficient time to sample all types of stream environments for this lab. The meterstick can be used to assess stream depth in the location you select for sampling.

The two student pairs at each site will select a riffle section of the creek within which they will gather a subsample (1 subsample per pair). The pairs will work spaced laterally across the stream channel so they do not affect each other’s subsample. Each pair will work to collect their “subsample” in an area one meter in length (the width of the D-net) up the stream channel.

2. The general procedure is that we will embed the bottom edge of the net (of the D-frame net) into the substrate, orienting the opening of the net upstream. We will then attempt to dislodge organisms from the substrate upstream of the net:

* One person should hold the net while the other is responsible for dislodging sample materials (described below). Dislodge your BMIs by working from the far end of your sample area (one meter in front of the net and the width of the net mouth), moving downstream toward your net.
* Pick up each stone greater than 2-in in diameter within your sampling area. While holding it underwater in front of the net, carefully rub it to dislodge any BMIs clinging to the stone.
* After you have completed all of the stones, rake through the streambed sediment of the entire sampling area to a depth of about 4 inches with a weeding tool. Be sure the material dislodged flows into the net.
* Remove the net with a forward (upstream) and upward scoop so as to not lose any sample material. Carry the net over to the streambank.

*Note: For a more precise measure of the streambed area sampled, scientists often use a modified net called a “surber sampler” which has a metal frame attached that sits on the streambed to clearly define the exact sampling area. This method requires more time and practice and we will stick to the D-nets for our lab exercise.*

3. Invert the net into a bucket with a small amount of stream water to keep the organisms cool and then use the wash bottles to rinse the net thoroughly to get all the organisms into the bucket. We’ll then bring the buckets back to the lab to preserve the samples for sorting on Thursday.

**LAB PROCEDURES**

Once you have collected your sample, head back to the lab to clean and preserve your sample. Work in the same pair that you did in the field.

1. Label a plastic sample jar with your names and sampling site (“south” or “north”). Fill the jar half full with 70% ethanol.

2. Gradually pour the contents of your bucket through the sieve provided. The larger material (BMIs, stones, organic debris) will be caught in the sieve while smaller diameter soil particles (silt) will wash through the sieve into the pan below. Use water from a wash bottle while gently agitating material in the sieve to wash as much silt from your sample as possible.

3. Carefully clean each stone in the sieve, removing any BMI and palcing it into your sample jar. Discard each stone into a separate container after it is cleaned.

4. Sort through the remaining material into the sieve and carefully remove any remaining BMIs, using tweezers or plastic spoons. Place them all into your sample jar.

5. When all BMIs are in your sample jar, close the lid. You will identify and sort these samples in the next lab session.

**Sampling Locations**

**North Creek**

**1-m long subsampling area collected by one pair of students**

***NORTH SITE***

***SOUTH SITE***

**Boardwalk**