

# Macroinvertebrate Sampling

## Preparing to collect:

Because macroinvertebrates have adapted to survive in a variety of stream conditions, all habitats need to be sampled. ***The preservative in the sample collection jars is rubbing alcohol.***

Where possible, three samples from at least three different (preferably all) habitats listed below need to be collected. The total site will be counted as one composite sample, so all the macroinvertebrates can be put into the same jar, regardless of where you found them.

Most Diverse Habitat	Riffles
	Leaf packs
⇕	Tree roots, snags, and submerged logs
	Undercut banks (overhanging vegetation)
	Submerged macrophytes (aquatic plants)
Least Diverse Habitat	Sediments

Crayfish, **live** clams, and **live** snails need only be **counted and released**. **DO NOT** preserve them in the alcohol! Empty shells tell us nothing about the current stream condition (we don't know when they died). so they are not counted.

A sample bottle and forceps should be carried by the volunteers in the stream to facilitate collecting fast moving organisms.

1. Survey a 300 foot stream stretch. If it is at a road crossing, sample upstream of the road.
2. Determine a plan of attack for collection sites based upon the above habitat chart.
3. Start at the downstream-most point, and work upstream so you always work into undisturbed water.
4. To make collection easier, the order of sampling sites may be mixed and collected in the same net load. For example: undercut bank, riffle, macrophyte, empty net, riffle, etc. Remember that everything is going into the same batch, so order doesn't matter. Do what is easiest for you.

### Keys to easier "picking" are

- ➔ Patience!
- ➔ Look for movement

# Riffles

1. Select the fastest and slowest moving areas of the riffle. Organisms collected from both these sites will constitute one riffle sample.
2. Begin at the downstream end of the reach to be sampled and work upstream. This keeps the working area undisturbed.
3. With the net opening facing upstream, place the bottom of the net flush on the stream bottom immediately downstream from the riffle. Position the handle perpendicular to the stream flow.
4. While the first volunteer ("netter") holds the net, the second ("collector") picks up large rocks (2 inch or greater diameter) within a 1 foot by 1 foot area directly in front of the net opening and gently rubs them in the net opening to remove any clinging organisms. Be sure to hold the rock under water in front of the net.
5. Gently place the cleaned rocks outside the sampling area.
6. When all the stones (or as many as possible) are removed from the sample area, the "collector" stands approximately one foot upstream of the net opening and kicks the stream bed vigorously to dislodge any remaining organisms into the net.
7. Kick down approximately two inches (approximately one to two minutes) while moving toward the net.
8. When done kicking, the "netter" sweeps the net in an upward fashion to collect the organisms.

**Note:** If the net is relatively empty after sampling at the first station, steps 9 - 12 may be skipped and the net emptied (according to steps 9 - 12) only as necessary.

9. Carry the net to the shoreline.
10. While the "collector" holds the sampling pan, the "netter" empties the net's contents into the tray.
11. Using the squirt bottle filled with stream water, rinse the inside of the net into the tray to collect all the organisms.
12. Remove any clinging organisms and place them directly into a sampling jar.
13. Collect a total of three riffle samples by repeating steps 1 - 12.

# Leaf Pack

1. Look for leaves that are about four to six months old. These old leaf packs are dark brown and slightly decomposed. Only a handful of leaves is necessary.
2. Begin at the downstream end of the reach to be sampled and work upstream. This keeps the working area undisturbed.
3. With the net opening facing upstream, place the bottom of the net flush on the stream bottom immediately downstream from the leaf pack. Position the handle perpendicular to the stream flow.
4. Gently shake the leaf pack in the water to release some of the organisms, then quickly scoop up the net, capturing both organisms and the leaf pack in the net.

**Note:** If the net is relatively empty after sampling at the first station, steps 5 - 8 may be skipped and the net emptied (according to steps 5 - 8) only as necessary.

5. Carry the net to the shoreline.
6. While the “collector” holds the sampling pan, the “netter” empties the net’s contents into the tray.
7. Using the squirt bottle filled with stream water, rinse the inside of the net into the tray to collect all the organisms.
8. Remove any clinging organisms and place them directly into a sampling jar.
9. Collect a total of three leaf pack samples by repeating steps 1 - 8.

# Tree Roots, Snags, and Submerged Logs

Snags are accumulations of debris caught or “snagged” by logs or boulders lodged in the stream current. Caddisflies, stoneflies, riffle beetles, and midges commonly inhabit these areas.

1. Select an area on the tree roots, snag, or submerged logs which is approximately 3 feet by 3 feet in size.
2. Begin at the downstream end of the reach to be sampled and work upstream. This keeps the working area undisturbed.
3. Scrape the surface of the tree roots, logs, or other debris with the net while on the downstream side of the snag. You can also disturb such surfaces by scraping them with your foot or large stick, or by pulling off some of the bark to get at the organisms hiding underneath. In all cases, be sure that the net is positioned downstream from the snag, so that dislodged material floats into the net.
4. You may remove a log from the water to better sample from it, but be sure to replace it when you are done.

**Note:** If the net is relatively empty after sampling at the first station, steps 5 - 8 may be skipped and the net emptied (according to steps 5 - 8) only as necessary.

5. Carry the net to the shoreline.
6. While the “collector” holds the sampling pan, the “netter” empties the net’s contents into the tray.
7. Using the squirt bottle filled with stream water, rinse the inside of the net into the tray to collect all the organisms.
8. Remove any clinging organisms and place them directly into a sampling jar.
9. Collect a total of three tree root samples by repeating steps 1 - 8.

## Undercut Bank and Overhanging Vegetation

Undercut banks are areas where moving water has cut out vertical or nearly vertical banks, just below the surface of the water. In such areas you will find overhanging vegetation and submerged root mats that harbor dragonflies, damselflies, and crayfish. Note: Do not collect crayfish in sample jars, simply note their presence and number.

1. Place the net below the surface under the overhanging vegetation.
2. Move the net in a bottom - up motion, jabbing at the bank five times in a row to loosen organisms.

**Note:** If the net is relatively empty after sampling at the first station, steps 3 - 6 may be skipped and the net emptied (according to steps 3 - 6) only as necessary.

3. Carry the net to the shoreline.
4. While the “collector” holds the sampling pan, the “netter” empties the net’s contents into the tray.
5. Using the squirt bottle filled with stream water, rinse the inside of the net into the tray to collect all the organisms.
6. Remove any clinging organisms and place them directly into a sampling jar.
7. Collect a total of three undercut bank samples by repeating steps 1 - 6.

# Sediments

Areas of mostly sand and / or mud can usually be found on the edges of the stream, where water flows more slowly.

1. A netter stands downstream of the sediment area with the dip net resting on the bottom. A collector disturbs the sediment to a depth of about two inches as he or she approaches the net.
2. The netter sweeps the net upward to collect the organisms as the kicker approaches.
3. Keeping the opening of the net at least an inch or two above the surface of the water, wash out the sediment from the net by gently moving the net back and forth in the water of the stream.

**Note:** If the net is relatively empty after sampling at the first station, steps 4 - 7 may be skipped and the net emptied (according to steps 4 - 7) only as necessary.

4. Carry the net to the shoreline.
5. While the “collector” holds the sampling pan, the “netter” empties the net’s content into the tray.
6. Using the squirt bottle filled with stream water, rinse the inside of the net into the tray to collect all the organisms.
7. Remove any clinging organisms and place them directly into a sampling jar.
8. Collect a total of three sediment samples by repeating steps 1 - 7.