

## Section IV: FIELD SAMPLING

### INTRODUCTION

Biological monitoring is a relatively easy science, but one that takes time to learn well. SalmonWeb incorporates the components to build a good monitoring program: setting up a quality assurance plan, selecting sampling sites, collecting benthic invertebrate samples, sorting and identifying the organisms, and summarizing the data.

**When to Sample:** Because SalmonWeb is designed to investigate change from year to year, sampling occurs once a year. A Fall sampling season, from mid August to mid October, allows monitors to sample when stream levels are at their lowest AND before most salmon runs occur. *Sampling should be completed before adult salmon return to spawn.*

### RESOURCES INCLUDED

- Karr's benthic macroinvertebrate sampling protocol
- Oregon Dept. of Environmental Quality Sampling Protocol
- Latitude/longitude location instructions
- Reach drawing example

### OBJECTIVES

The workshop participants will:

- Practice following a protocol to collect a sample of benthic macroinvertebrates
- Learn how to choose a good sampling location along a reach of stream
- Learn to determine the latitude longitude location of their sampling site
- Draw a picture of their sampling reach

# Karr Benthic Macroinvertebrate Sampling Protocol

## **Checklist of materials:**

- Meter tape to identify location
- 500 micron mesh Surber sampler
- 2 500 micron mesh sieve (or smaller)
- Waders (for each person)
- Flagged weight to identify sample location
- Isopropyl alcohol
- 1-liter squirt bottle for isopropyl alcohol; second bottle to refill the first
- Garden trowel to disturb substrate
- Stop watch
- 2 White buckets to empty sample from Surber
- Large cup with handle to rinse invertebrates off Surber
- Forceps (Tweezers)
- Plastic spatula
- Waterproof ("Rite-in-the-rain") paper
- Pencil, permanent marker (Sharpie), and grease pencil
- Screw-top vials
- Ziploc bags
- Camera

## **Sampling Protocol for Benthic Invertebrates**

### Select site

Locate stream reach to be sampled. Find a riffle (fast moving water over rock or cobble substrate, surface water should be broken) near the middle part of the stream. Riffle should be long enough to accommodate three replicate samples. Ideal sampling locations consist of rocks 5 to 10 cm in diameter sitting on top of pebbles. Substrates dominated by rocks larger than 50 cm in diameter should be avoided.

Sample within main flow of the stream. Sample at water depths of 10 to 40 cm. Depth, flow and substrate type should be similar for the three replicate samples collected in the riffle. Begin sampling downstream and proceed upstream for the three replicates.

Avoid bridges and other large human-made structural features. If unavoidable, sample at least 50 meters upstream of a bridge and 200 meters (more would be better) downstream of a bridge.

Write down the exact location of the sample site. Use meter tape to measure distance from nearest landmark.

## **Karr Benthic Macroinvertebrate Sampling Protocol cont.**

### Collect invertebrates

Sampling teams may range from 2 to 4 people. Actual collection of macroinvertebrates requires 2 people. Others can assist with equipment, labeling collections and other duties.

1. Place Surber sampler on the selected spot with the opening of the nylon net facing upstream. Brace the frame and hold it firmly on the creek bottom.
2. Lift the larger rocks resting within the frame and brush off crawling or attached loosely organisms so that they drift into the net. After 'cleaning' the rocks, place them in a bucket.
3. Once the larger rocks are removed, disturb the substrate vigorously with a trowel or large spike for 60 seconds. This disturbance should extend to a depth of about 10 cm to loosen organisms in the interstitial spaces, washing them into the net.
4. Lift Surber out of the water: Tilt the net up and out of the water while keeping the open end upstream. This helps to wash the organisms into the receptacle. Drop a piece of weighted flagging tape to mark the location of the first replicate sample.
5. On the creek bank, empty contents of Surber into large bucket. Rinse Surber and empty into bucket until all animals are removed. Great care should be taken in this step to collect and preserve all organisms from the Surber sampler as well as from the rocks and water in the bucket. Use of a magnifying glass and tweezers is essential. Rinse bucket through sieve to remove water from sample. Pick out large debris (sticks and leaves) after carefully removing any invertebrates.

### Archive sample

Use spatula to move sample from sieve into a plastic vial. Fill vial to the top with isopropyl alcohol. Put label on inside of vial with name of sampler, date, location, and replicate number. Write location and date on top of vial lid. Place vial in a Ziploc bag labeled with the same information.

### Collect replicate samples

Return to the location of the first sample, walk upstream and collect another sample of invertebrates. Leave another flagged marker and process the sample as above. Repeat this process once more for a total of three replicate samples from each site location. Each replicate should be labeled (e.g., #1, #2, #3) and archived separately.

\* Protocol furnished by L. Fore, 1997.

# Site Description Form

**Date** \_\_\_\_\_(day/month/year)

**Site Location** City\_\_\_\_\_ State\_\_\_\_\_

Watershed\_\_\_\_\_ Stream\_\_\_\_\_

**Weather**  Sunny  Cloudy  Partly Cloudy  Raining  Foggy

**Longitude** \_\_\_\_\_degrees \_\_\_\_\_minutes \_\_\_\_\_seconds

**Latitude** \_\_\_\_\_degrees \_\_\_\_\_minutes \_\_\_\_\_seconds

**USGS map used** \_\_\_\_\_(include height and width scale)\_\_\_\_\_

**Elevation** \_\_\_\_\_(Meters)

**Land Uses**  Urban  Suburban  Agricultural  Grazing  Forest

**Channelized**  Yes  No

**Culverts** Upstream  No  Yes Approx. distance from sampling site\_\_\_\_\_ (Meters)  
Downstream  No  Yes Approx. distance from sampling site\_\_\_\_\_ (Meters)

**Dams** Upstream  No  Yes Approx. distance from sampling site\_\_\_\_\_ (Meters)  
Downstream  No  Yes Approx. distance from sampling site\_\_\_\_\_ (Meters)

**Inorganic substrate**  Boulders  Rubble  Gravel  Sand  Silt  Clay

**Embeddedness** \_\_\_\_\_(%)

**Sediment** \_\_\_\_\_(%)

**Organic substrate**  Mud/Muck  Detritus  Logs/Limbs  Pulpy Peat  Fibrous Peat

**Bank Slope**  Steep  Moderate  Slight  Other \_\_\_\_\_

**Bank Stability**  Stable  Slightly Eroded  Moderately Eroded  Severely Eroded

**Bank Material**  Clay  Rock  Dirt  Mud  Stones  
 Other\_\_\_\_\_

**Bank Vegetation**  Barren  Grasses  Herbaceous  Brush  Deciduous  
 Evergreen  Other\_\_\_\_\_

**Stream Shading** \_\_\_\_\_(%)

**Channel cross-section**  Rectangular  U-Shaped  V-shaped  W-Shaped  
 Other\_\_\_\_\_

**Undercut Banks**  No  Yes

**Air Temperature** \_\_\_\_\_(C)

**Water Temperature** \_\_\_\_\_(C)  
(at site)

**Water Temperature** \_\_\_\_\_(C)  
(1 mile upstream)

**Surface Oils**       None     Some     Lots

**Water Odors**       Normal     Sewage     Petroleum     Chemical     Other\_\_\_\_\_

**Stream Width** \_\_\_\_\_(Meters)  
(at sampling site)

**Surface Velocity** \_\_\_\_\_(Meters/second)

**Water Depth** \_\_\_\_\_(Meters)

**Riffle Length** \_\_\_\_\_(Meters)

**Riffle Width** \_\_\_\_\_(Meters)

**Distance between replicates within riffle** \_\_\_\_\_(Meters)

**Additional Notes**  
on this form.

**Document below any information or observations you made that are not included**