

## BCWA Field Method

**Accepted:** December 17, 2014

**To:** BCWA

**From:** Russell N. Clayshulte, Manager

**Re:** M04 - Macroinvertebrate Field Sample Method



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Since 2004, the BCWA has conducted macroinvertebrate sampling and data collection at 14 sites along the mainstem of Bear Creek (*BCWA Fact Sheet 32 Stream Macroinvertebrates*), including Colorado Parks and Wildlife fish survey sites along Bear Creek: Morrison (west end), Idledale, Lair o' the Bear Park, O' Fallon Park, Bear Creek Cabins, Main Street Evergreen (across from the Little Bear), above Evergreen Lake upstream within Dedisse Park, Bear Tracks near Mount Evans Wilderness, above Singing River Ranch, and Golden Willow Bridge.

In 2014 the ten sample sites selected for continued Macroinvertebrate sampling, with no duplicates:

1. Bear Creek Park below bridge
2. Morrison at gaging station
3. Idledale, 200 feet upstream of sample site near bridge
4. Lair O' Bear, 200 feet upstream of sample site
5. O' Fallon Park, in new parking lot
6. BCC at Bridge, 50 feet downstream OWTS
7. Little Bear, downtown and 50 feet downstream of sample site
8. Keys on the Green, at bridge,
9. Golden Willow, 300 feet upstream of bridge
10. Upper Bear Creek above SRR, BCWA Site 58.

Sample collection is done by the Water Quality Control Division timed-kick net methodology protocol (*WQCD SOP-001 Benthic Macroinvertebrate Sampling Protocols, May 2010*). Only fast riffles are targeted for sampling. Riffle habitat refers to the portions of the stream where moderate velocities and substrate roughness produce turbulent conditions which break the surface tension of the water and may produce whitewater.

The index period is the period of time that samples should be collected to minimize seasonal variation. The standard index period utilized by the Water Quality Control Division is summer to early fall, namely July 1 to October 31. This period is congruent with the central tendency of sample dates of macroinvertebrate replicates used to regionally calibrate the multimetric indices. The WQCD protocol recommends that benthic macroinvertebrate samples be collected once per year and within the standardized index period. The study reach should be representative of the typical habitat conditions that occur at the selected sample reach.

The BCWA kick net, which conforms with the WQCD protocol, is comprised of the following components: 1) 18" x 8" rectangular frame, 2) 500  $\mu$ m mesh nylon bag with canvas reinforced bottom and shroud reinforced opening, 3) 2 piece long handle ( $\approx$  70 inches long), 4) Sieve dolphin bucket (504  $\mu$ m mesh) and Sieve bucket adaptor. Other equipment used for the survey includes 2-gallon sample buckets, tweezers, 500 ml wash bottles, a 35 mesh (500  $\mu$ m) sieve, sample bottles, denatured alcohol for preservation, water proof labels, watch for timing collection.

## **Sample Method**

1. Ensure that the sampling net and sieve bucket are clean prior to usage.
2. Select a dominant riffle within the study reach.
3. Place the net frame flush to the streambed with the frame open to the upstream flow. Check that the nylon bag and sieve bucket are freely floating immediately downstream of the net frame. This will ensure that once the substrate is disturbed that specimens will float directly through the nylon bag and into the capture sieve bucket.
4. Lower the handle forward in an upstream direction until the sampling net is nearly horizontal to the water surface but the net frame is still flush to the streambed. The point at which the tip of the handle extends along the streambed is the point at which the kicking activity will cease. This distance multiplied by the width of the net frame equals one square meter. Return the handle to a vertical position.
5. Position yourself next to sampling net and begin to disturb the substrate immediately upstream of the net. Disturb the substrate using the heel of your boot or entire foot by kicking to dislodge the upper layer of cobbles or gravel and to scrape the underlying bed. The area disturbed should extend no further than the point delineated in Step 4 and not exceed 1 minute. Approximately 0.25 meters should be disturbed for every 15 seconds.
6. Larger cobble may be scraped by hand, if necessary, to remove specimens. Cobble should be scraped clean quickly and efficiently as the scraping is counted within the one minute time frame.
7. Avoid filling sample net and dolphin sieve with fine sands or boulders.
8. Rinse contents of dolphin sieve into transfer sieve over bucket, transfer smaller material to collection container.
9. Transfer material (matrix of specimens and insubstantial amount of stream substrate/detritus) from the interior of the net and sieve bucket into the sample jar and wash or pick all specimens off the net interior. Specimens that cling to the exterior of the net are not considered part of the sample. They may be removed and placed back into the stream.
10. Release back into the stream any fish, amphibians, reptiles or crayfish caught in the net.
11. If excessive or large debris items are present then rinse over sieve and then discard large debris back to stream.
12. Rinsed clean kick-net by backwashing with site water before collecting additional samples.
13. Label and preserve collected sample for transport to laboratory.

