

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD
SURFACE WATER AMBIENT MONITORING PROGRAM PROTOCOL
OR
SWAMP

Five parts: 1) Water quality measurements 2) Setting up the transects 3) Photographs
4) Benthic Macroinvertebrate (BMI) sampling 5) Physical Habitat (P-hab) measurements

1. Water Quality Measurements: temperature, pH, conductivity, DO, turbidity, alkalinity (we presently do not have the equipment for alkalinity measurements). Take WQ measurements at the downstream end, if possible, of the reach before BMI samples or P-hab measurements. This minimizes disturbance.

2. Setting Up Transects for BMI Sampling and P-hab Measurements: 1) Determine 150 meter reach in sampling area by measuring 11 evenly spaced transects (15 meters apart) along the reach and mark with flags labeled A through K. We have already selected and measured our reaches for 100 meters. We will add 50 meters to the downstream end of TRC-1 (Nature Area) and TRC-4 (Meadowbrook) and the upstream end of TRC- 5 (Traverse Creek Falls). 2) Record GPS for downstream end. 3) Walk the reach, counting each riffle and making a sketch of the reach on the field form. At this point we will randomly select 8 riffles for sampling and flag them in a different color.

3. Photographs: Minimum of 4 in the reach at 1) top end facing downstream(transect K) 2) midway (transect F) facing upstream and downstream and 3) bottom facing upstream (transect A). All the photographs will be taken from the bank to minimize disturbance. Record image numbers on field form. Follow labeling procedure outlined in protocol after downloading photos.

4. BMI Sampling: Start at downstream riffle. 1) Choose 2 random numbers between 0 and 9. The first number will determine the percent upstream along the riffle. The second will determine the percent across the riffle (in the Nature Area we will use simply 1,2 3, for near side, middle, and far side). 2) Set D-net in position from downstream of sampling location to minimize disturbance. 3) Use a combination of methods (we will discuss these) to remove bugs from rocks and wash them into net. 4) Continue to next riffle with partially full net (we may also choose to put material into a bucket with stream water if it becomes overloaded). 5) After finishing all riffles, put sample into jar(s), preserve them with ethanol, and label both inside and outside of jar with pre made labels. Fill in all information. 6) Determine substrate size, CPOM and embeddedness (see below) at each BMI riffle.

5. P-hab Measurements: We will using the *basic* method outlined in the protocol and add a few twists of our own. **1) Wetted width at each transect.** This is the width of the water across the channel. **2) Substrate measurements – particle size, CPOM and embeddedness.** This is not required in the basic level but we will take these measurements in our BMI riffles only and will equal 8 transects. We will use the method outlined in the protocol, just fewer transects.

3) Canopy cover at each transect. Using the method outlined in the protocol, four densiometer readings will be taken from the middle of each transect – right bank, left bank, upstream and down stream. **4) Visual estimate of human influence.** Estimate human influence at each transect within the channel to 5 meters upstream and downstream, on the bank to 10 meters out on either side and 10 meters to 50 meters beyond on either side. Use categories provided on form. **5) Visual estimate of riparian vegetation.** Estimate riparian vegetation beyond the bankfull margins (we will discuss this definition) at each transect by dividing them into these categories: ground cover (< 0.5 m), lower canopy (0.5-5m), upper canopy (>5m). Use vegetation classes on form to determine density of each category. **6) Flow habitats** – Stand at a location between each of 2 transects (eg. between A and B) and estimate the percentage of water that fall into these categories: cascade/fall, rapid, riffle, run glide, pool, dry (see form for definitions). These will total 10 between-transect measurements. **7) Velocity area measurements** – This is not required for the basic level, but we have the velocity meter and have used it in the past, so we might as well take this measurement. Select 1 (one) location on the reach that is without obstruction but has a flow (enough to turn the propeller on the velocity meter) like a run or glide. Measure the wetted width and divide it into 10 sections (in the Nature Area, we will use the small channel method which measures the channel into 15 cm sections). Measure the depth and flow in the middle of each section and record on form (1st page). **8) Reach slope** – Determine slope of the reach using the clinometer and stadia rod (or marked pole) in visual segments from upstream to downstream. Use as many segments as necessary. **9) Additional habitat characterizations** – Use form on bottom of page 3 to characterize epifaunal substrate/cover, sediment deposition, channel alteration.

THAT'S IT!! WE ONLY DO THIS ONCE A YEAR AT EACH BENTHIC MACROINVERTEBRATE LOCATION SO IT'S NOT SO BAD. I THINK THAT WE WILL BE ABLE TO ZIP THROUGH THIS ONCE WE HAVE SOME PRACTICE.