**Sedimentation Traps SOP**

Initial trap deployment

Sediment traps are attached to the catwalk via nylon rope. In 2014 and 2015, traps were deployed at 4m and 8m depths (measured from the surface of the water to the top of the trap opening) in the water column. The 4m rope is attached to the east side of the catwalk and the 8m rope is attached to the west side of the catwalk. To deploy the trap, pull the loose rope up from the water column, keeping the line on the outside of the catwalk railing. Tie the loose end of the rope to the eye of the trap with a bowline knot. Standing on the railing, slowly lower the sediment trap towards the water column, taking care not to tangle the line up with the arms of the trap. Do not drop the trap; slowly lower the line until it is fully extended. Use a friend if necessary, the traps are heavy.

Trap collection in the field

The sedimentation traps hold a total of 4L of sample (2 tubes x 2L per tube). Four 1L plastic bottles may be used for collection (e.g. 2 bottles labeled 4A+date and two labeled 4B+date for the 4m trap). The sedimentation traps should not be deployed for more than 4 weeks at a time because of sample degradation. During the stratified period, 2 week deployment time is ideal for sufficient particulate matter collection.

*Collecting sample*: Care must be taken to apply a continuous upwards force on the sedimentation trap to avoid sample loss in the water column. The rope must be pulled towards the surface from the outside of the catwalk railing. The sedimentation traps are heavy in the water and heavier outside of the water. Do not let them pull you over the railing -- seek assistance if necessary. Gloves may be helpful for proper grip and to avoid friction burn.

Carefully pull up enough slack from between the railing to allow yourself to get a grip of the rope over the outside edge of the railing -- do not ever let the trap drop at all after you begin pulling it up. Steadily pull the traps toward the surface, upon reaching the water surface you may pause to improve your grip/rest/curse/etc. Pull the trap through the air, careful not to bang the trap against the railing to avoid sample loss. You may balance the trap on top of the railing or place it on the walkway.

Loosen the wing nuts holding the tubes in place and carefully slide the tube out of the holder. Each tube contains 2L of sample. With minimal disturbance of the particulate matter, pour 1L of water into the first 1L plastic bottle. Some initial spillage is unavoidable and it is better to pour quickly to minimize spilling down the side of the tube. For the second 1L bottle, pour about half of the remaining water, then swirl the tube to suspend any particulate matter. While the particulates are suspended, pour the remaining slurry into the plastic bottle. Repeat for the replicate tube.

The tubes should be cleaned of algae each time they are collected. The can be achieved using a long handle brush. You may take the tube to the water’s edge, scrub the evil colonies from the inside of the tube and rinse with lake water. Return the cleaned tubes to the holders on the trap. Tighten the wing nuts, but do not overtighten; they only need to apply a slight pressure to the side of the tube to prevent movement -- gravity will predominantly keep these in place when they are suspended. Deploy them back into the water slowly, without dropping the slack. Don’t get the rope tangled.

Store the filled sample bottles under refrigeration until processing.

Filtering samples

The mass of particulate matter can be determined gravimetrically after filtering the samples. First tare an empty filter paper (Whatman 934-AH filters were used in 2014 and 2015; 1.5 μm). Put the paper on the filter holder/Büchner funnel, attach the holder to a vacuum flask, attach a line to the vacuum flask from the vacuum, and begin the vacuum. Carefully pour the sample into the filtering cup. If there are particulates at the bottom of the sample container, try not to let these pour out until the water volume is nearly gone (they will slow down filtering dramatically). You will likely need to pour out the filtrate from the vacuum flask at least once before the entire sample has been filtered to avoid sucking water through the vacuum.

Once the sample has finished filtering, turn off the vacuum and transfer the filter to a petri dish or other holder. The sample may air-dry for several days to a week in a well-ventilated area or placed in a drying oven at <40 degrees C. After the sample is completely dried, weigh the filter. Calculate the mass of the particulates by difference between the final filter weight and the empty filter weight. Using the area of the sedimentation trap opening, the deployment duration, and particulate mass, it is possible to calculate a flux, e.g.:

J = mass / area / time

This can be used to extrapolate a loading over the area of the lake, e.g.:

L = J \* area of 8m or 4m depth contour

The replicate samples collected at each depth may be used to determine the standard deviation of the measurements. Remember that the flux or loading represents an average over the interval that the traps were deployed.