BCWA Field Method

Date: **January 30, 2015**

To: BCWA

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

Re: **M06 - Water Clarity Estimation Methods**

Light penetration into water is an important regulator of biological and ecological functions in an aquatic system, such as a stream, lake, or reservoir. Total suspended solids (TSS) reduce light penetration in water. TSS is particles larger than 2 microns found in the water column. Anything smaller than 2 microns (average filter size) is a dissolved solid. Most suspended solids are made up of inorganic materials, though bacteria and algae can also contribute to the total solids concentration. The more suspended solids in the water column, the less clear the water (clarity) and less light penetration. Turbid water can appear dirty, cloudy, murky, or otherwise stained, which affects the physical look of the water. Trained field staff can often make quick estimations on the amount and type of TSS occurring in a water body. This can be a valuable field method for streams and rivers to predict upstream conditions, activities or potential problems.

The Secchi disc is used by the Bear Creek Watershed Association in lakes and reservoirs in the watershed to estimate light penetration or clarity. The Secchi disc used by the BCWA is a weighted standard 20 cm diameter, black and white disc attached to a 25-meter tape on a reel (Figure 1). The disc is lowered slowly down into the water column on the sunny side of the boat. The depth measured at the water surface at which the disc is no longer visible is taken as the Secchi depth and is related to water turbidity. The disc can be raised and lowered several times to get the best estimation of the Secchi depth. Different observers can get slightly different results, as such the BCWA generally has the same person take measures on a given water body, which allows for relatively similar readings between sampling events.

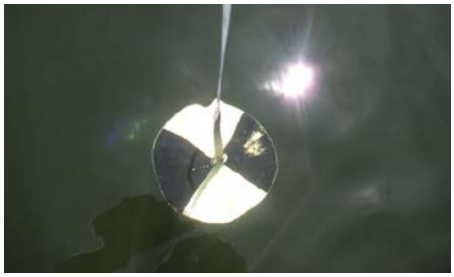

Figure 1 Secchi Disc being Lowered into BCR

In watershed streams, a Secchi disc isn't a practical method to estimate clarity, generally because of the shallower stream depths and flowing water. As such, the BCWA devised a simple visual estimation method to characterize the variations in water clarity or more effectively, the amount of water staining observed during a sampling event. Generally, the clarity of the stream water is a reflection on the amount of TSS (sediment) and character of that sediment or TSS being transported by the stream. The visual estimation method can also indicate if there is an upstream erosional problem. The BCWA uses five categories to estimate stream water clarity: Clear, Slightly Murky, Murky, Very Murky, and under rarer conditions with extremely heavy TSS runoff – Turbid (Table 1).

Table 1 Water Clarity Categories used by the BCWA to Visually Estimate Stream Water Clarity

C	The water is clear with no visible staining; bottom of the channel can be clearly seen. There may be some periphyton growth, but not changing water clarity. 
SM	The water is slightly murky or stained, while the bottom of the stream bed is visible, it isn't clear. This category can also include slightly milky or colored water caused by algal growth or other unknown surface sheens. 
M	The water is murky and the stream bed is poorly visible or obscured; water tends to be brown or grey, and clearly stained. This category also includes milky or colored water caused by algal growth or unknown surface sheens. 
VM	The water is very murky and the stream bed is generally not visible. The water is strongly colored with clear indication of sediment, TSS or other material transport. 
T	The water is turbid with an extreme amount of TSS or sediment transport.