STANDARD OPERATING PROCEDURE 3.1.5.9.a

Instructions for Determination of Apparent Color of Water

1. INTRODUCTION

Apparent color of water results from dissolved substances and suspended matte. Apparent color provides general but useful information about the water's source and content. Metal ions, plankton, algae, pollution and other natural and human-induced materials may all produce color in water. Depending on the materials in it, water absorbs certain wavelengths of light, and reflects others. The reflected wavelengths are the ones we observe when determining apparent color.

Transparent water with a low accumulation of dissolved materials appears blue and indicates low productivity. Dissolved organic matter, such as humus, peat or decaying plant matter, can produce a yellow or brown color. Some algae or dinoflagellates produce reddish or deep yellow waters. Water rich in phytoplankton and other algae usually appears green. Soil runoff produces a variety of yellow, red, brown and gray colors.

Uniform color scales are used in determining apparent color to ensure that standardized color information can be shared and compared between researchers. Several color scales can be used for identifying color such as Munsell color identification charts (Fig. 2) or the Borger Color System (Fig 3) Some programs may even select certain color chips and design their own color comparator for apparent water color, Fig. 4 (Ohio Lake Management Society).

2. PURPOSE

Accurate documentation of water color is important as it indicates source of water and pollutants and also provides details on environmental setting of the water body. This Standard Operating Procedure (SOP) describes the precise method of identifying apparent color of water as there are many inconsistencies reported while documenting water color which exist because of indistinct guidelines.

3. TOOLS

Fig. 1: Transparent Container

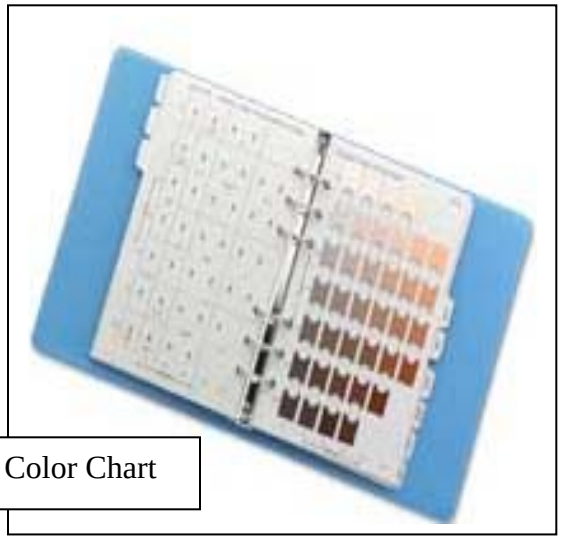

Fig. 2: Munsell Soil Color Chart

Fig. 3: BCS (Borger Color System) by Gary

Fig. 4: Custer Color Strip

4. PROCEDURES

For Apparent Water Color

The water color observed directly from the water body does not provide apparent color. This is due to the color of light reflected by bottom sediments, algae, canopy cover and also the reflected sky color. To avoid this, water should be transferred into a transparent container (Fig. 1) which gives the apparent color of water by visual comparison of sample with a color comparator (Figs. 3-5). Sometimes deciding one number is too difficult, in this situation the operator may use up to two numbers which best describe the apparent color.

Fig. 5: Forel-Ule Scale and Secchi Disk

Using a Forel-Ule Scale (Not Apparent Water Color)

When using a Secchi disk to determine transparency depth a Forel-Ule scale may be used to determine color. This is done by submerging a Secchi disk with the all white side facing up. Hold the disk at a depth just before it disappears. With the submerged Secchi disk as background, compare the Forel-Ule color standards and the water color as seen through the comparators viewing windows.

4.0 REFERENCE

Borger, Gary, 1995. Borger Color System, 3rd Edition. Tomorrow River Press. Wausu, WI

La Motte, 2001. Forel-Ule Color Comparator Kit Instruction Manuel: Model FLU, Code 5907.

Munsell Color Corporation. 1975. Munsell Soil Color Chart, Ringbound Edition.

Ohio Lake Management Society. 2003. Citizen Lake Management Society Quality Assurance Project Plan.