

Standard Operating Procedure (SOP) 4.9.1.1

Measuring Canopy Cover Using a Seventeen Point Spherical Convex Densiometer

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1.0 INTRODUCTION

Riparian canopy cover over a stream is important not only in its role in moderating stream temperatures through shading, but also as an indicator of conditions that control bank stability and the potential for inputs of coarse and fine particulate organic material. Organic inputs from riparian vegetation become food for stream organisms and structure to create and maintain complex channel habitat. Determining a stream's integrity is done by assessing the biota and physical habitats. Estimation of canopy cover contributes to this assessment. This method (Ode 2007) uses the Strickler modification (17-point) of a convex spherical densiometer to correct for overestimation of canopy density (thickness and consistency of plant foliage) that occurs with unmodified readings (Strickler 1959).

2.0 EQUIPMENT

17-point modified convex spherical densitometer (Strickler 1959).
(Mounting the densiometer onto a tripod for stabilization while reading measurements is optional.)

3.0 PROCEDURE

Densiometer measurements are taken at 0.3 m (1 ft) above the water surface, rather than at waist level, to avoid errors because people differ in height; avoid errors from standing in water of varying depths; and to include low overhanging vegetation more consistently in the estimates of cover.

Keep the densiometer level using the round bubble level found in the densimeters lower right-hand corner.

Hold the densiometer far enough away from your body so that your head is just outside the grid (12-18" away) and 0.3 m (1 foot) above the water surface with your face just below the apex of the "V" as if it was being reflected within the densimeters mirrored surface, see Figure 1. Concentrate on the 17 points of grid intersection on the densiometer that lie within the taped "V" area.

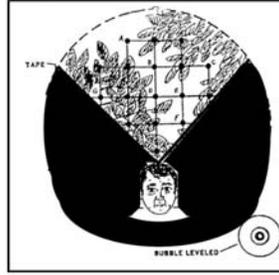


Figure 1 Schematic of modified convex spherical canopy densiometer (modified from Mulvey et al., 1992).

In the example shown in Figure 1, 11 of the 17 intersections show canopy cover, giving a densiometer reading of 11. Note proper positioning with the bubble leveled and face below the apex of the “V.”

Each point represents an area of canopy opening (sky...) or canopy cover (vegetation...). Count the number of canopy covered points. Take and record four 17-point readings. These are all taken from the center of each transect (transect = wetted width): a) facing upstream, b) facing downstream, c) facing the left bank, d) facing the right bank, see figure 2.

Figure 2 Obtaining Densiometer Readings



facing upstream facing downstream facing the left bank facing the right bank

If the reflection of a tree or high branch or leaf overlies any of the 17 intersection points, that particular intersection is counted as having cover. For each of the four measurement points, record the number of intersection points (maximum=17) that have vegetation covering them

4.0 REFERENCE

C.D.P.R. 2004 SOP Number: FSOT.002.01, STANDARD OPERATING PROCEDURE Instructions for the Calibration and Use of a Spherical Densiometer. California Department of Pesticide Regulation, Environmental Monitoring Branch. 4pp

Ode, Pete 2007 Standard Operating Procedures for Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient

Bioassessments in California. State Water Resources Control Board, Surface Water Ambient Monitoring Program. 48pp.

Mulvey, M., L. Caton, and R. Hafele. 1992. Oregon Nonpoint Source Monitoring Protocols Stream Bioassessment Field Manual for Macroinvertebrates and Habitat Assessment. Oregon Department of Environmental Quality, Laboratory Biomonitoring Section. 40 pp.