

AN UNDERWATER SURVEY METHOD FOR ESTIMATING SUBMERGED MACROPHYTE POPULATION DENSITY AND BIOMASS

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Abstract: Self-contained underwater breathing apparatus (SCUBA) was used to observe 40 species of submerged aquatic macrophytes in a large freshwater lake (Lake George, N.Y.) to determine its usefulness in the rapid assessment of relative species abundance and biomass. A population density index was used to estimate population densities for each species growing between 1 and 15 m deep. The exponential scale of the index permitted the scoring of population densities from 0.01 to 5,000 plant growing points m^{-2} based upon an average observation area of 1,000 m^2 . SCUBA observations as a means of estimating abundance were calibrated by collecting plant shoots with densities corresponding to each point on the scale and determining the number of shoots m^{-2} for each species present. Direct underwater observations of plant communities covering large areas yielded comprehensive data on species diversity, population density and biomass. The population density index was found to be statistically valid using 95% confidence limits and prediction intervals. When this index is used in conjunction with the average dry weight of mature shoots for each species, a useful estimation of the mature biomass for each species is possible to within an order of magnitude over a range from 0.01 to 200 g dry weight m^{-2} .

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