

INFLUENCE OF RAPID LABORATORY ASSESSMENT ON DETERMINING BENTHIC MACROINVERTEBRATE DIVERSITY

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The impacts of mining, agriculture, recreation, logging, and other human uses often impact lotic ecosystems. Traditionally, chemical measures have been used to determine the quality of water for its designated use. However, these measures are valid for the specific place and time that they are made. By using a biological component of the ecosystem, namely benthic macroinvertebrates, a longer-lasting impact or disturbance on the lotic system can be discerned. This is because benthic macroinvertebrates are differentially sensitive to pollutants, react quickly to disturbance, exhibit graded responses to those disturbances, and are rather sedentary, reflecting local impacts. However, certain weaknesses associated with biological monitoring of water quality using benthic macroinvertebrates do exist. These include the need for taxonomical knowledge of the community and labor intensive processing of samples. These can be overcome by using the Sequential Comparison Index (SCI) in conjunction with binomial sequential sampling plans. We therefore constructed two binomial sequential sampling models and used these on eighty-three macroinvertebrate samples collected from streams in Wyoming that had various levels of disturbance. Each of these samples was completely processed (whole sample), partially processed (70% of the entire sample) and processed using each of the two sequential sampling models using the SCI, which is a similarity index based on the binomial distribution. Results showed that significant processing time is saved by using either of the sequential sampling models in lieu of either processing the whole sample or the sub sample. Implications of these results are presented and discussed.