OWQ WaQI Note

April 17, 2008

Office of Water Quality Water-Quality Information Note 2008.11

Subject: PUBLICATIONS - New publication in USGS Techniques and Methods--

Bales, J.D., and Nardi, M.R., 2007, Automated routines for calculating whole-stream metabolism-Theoretical background and user's guide: U.S. Geological Survey Techniques and Methods 4-C2, 33 p. and associated software

Download metabolism software (ZIP, 27.9 MB)

Background: The U.S. Geological Survey's National Water-Quality Assessment (NAWQA) Program is assessing the effects of nutrient enrichment (nitrogen and phosphorus) on stream ecosystems in agriculturally dominated landscapes. This study provides nationally consistent and comparable data and analyses of nutrient conditions, including how these conditions vary as a result of natural and human-related factors, and how nutrient conditions affect biological communities and ecological processes in streams. One of the primary objectives is to assess the interrelation among nutrients, algal biomass, and stream metabolism, defined as the gain and loss in dissolved oxygen associated with photosynthesis and plant and animal respiration.

In order to standardize methods and facilitate rapid calculation and archival of stream-metabolism variables, the Stream Metabolism Program was developed to calculate gross primary production, net ecosystem production, respiration, and selected other variables from continuous measurements of dissolved-oxygen concentration, water temperature, and other user-supplied information. Methods for calculating metabolism from continuous measurements of dissolved-oxygen concentration and water temperature are fairly well known, but a standard set of procedures and computation software for all aspects of the calculations were not available previously. The Stream Metabolism Program addresses this deficiency with a stand-alone executable computer program written in Visual Basic.NET®, which runs in the Microsoft Windows® environment.

All equations and assumptions used in the development of the software are documented in this report. Detailed guidance on application of the software is presented, along with a summary of the data required to use the software. Data from either a single station or paired (upstream, downstream) stations can be used with the software to calculate metabolism variables.

Additional Information:

General information on the NAWQA Nutrient Enrichment Effects Team can be viewed at http://wa.water.usgs.gov/neet/index.html, with the publication and software available at http://wa.water.usgs.gov/neet/products.html.

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