STANDARD METHODS
FOR THE
EXAMINATION OF WATER AND WASTEWATER
JOINT EDITORIAL BOARD

MEMORANDUM

Sponsors

Andrew Eaton

TO: *Standard Methods* Users
Biochemical Oxygen Demand

FROM: Andrew Eaton
Joint Editorial Board

RE: BOD as an Indicator of Nutrient Pollution DATE: November 19, 2014

This letter is in response to questions about the use of the BOD test as a measure of nutrient pollution. The BOD test (Standard Method 5210 B) is not considered to provide an appropriate measure of nutrient pollution nor is it a valid predictor of nutrient impacts. The BOD test is specifically intended to measure oxygen demand due to the biochemical degradation of organic material by microorganisms (bacteria) and includes the oxygen used to oxidize inorganic materials such as sulfides and ferrous iron. The test may also measure the amount of oxygen used to biologically oxidize reduced forms of nitrogen such as ammonia unless an inhibitor is used. Nutrients (N and P) do not exhibit an oxygen demand, per se, and where significant concentrations of viable algal cells are present in a sample, algal induced "BOD" does not represent the microbial degradation of organic substances that the test is intended to measure. Biostimulation tests (*Standard Method* 8111) are better suited to determine the impact of non-carbon nutrients on algal growth than are BOD tests.

Furthermore, the BOD5 test requires the addition of nutrients to the sample as part of the test procedure. This has been shown to be a necessary step to ensure optimum utilization of organic matter by the test organisms in the various dilutions used in the assay. However, the act of adding nutrients to the test bottle further limits the ability to use the BOD5 test as a predictor of non-carbon nutrient loading in a receiving water. This is especially true in view of the fact that phosphate and nitrate are typically the major non-carbon nutrients contributing to stream degradation, and they do no exert any oxygen demand since they are already oxidized to the highest oxidation state of the parent nutrient atoms (N and P).