



School for Marine Science and Technology

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May 1, 2015

VIA E-MAIL

Mr. Joe Federico
Beta Engineering Inc.
6 Blackstone Valley Place
Suite 101
Lincoln, RI 02865

RE: Use of Sentinel Site Approach Based on Massachusetts Estuary Project Data for Setting Nutrient Objectives for the Taunton Estuary

Dear Mr. Federico:

I understand that the City of Taunton and other communities tributary to Mount Hope Bay are interested in undertaking a detailed analysis of existing studies and system requirements with the objective of creating a scientifically defensible approach to setting nutrient reduction requirements for the Taunton Estuary and eventually, Mount Hope Bay (MHB). That action is to be applauded and is, in my opinion, long overdue. This letter responds to your recent inquiries regarding the sentinel site approach used by EPA in setting nutrient objectives for the Taunton Estuary based on data that I collected in 2004-2006 for that system that was to support a future Massachusetts Estuary Project (MEP) nitrogen threshold assessment.

The purpose of that data collection was to allow the MEP process to be initiated, to allow water quality model verification and to allow for an empirical evaluation of how nutrients are currently impacting various areas of the Mount Hope Bay-Taunton River system. However, as is clear from our report, additional studies and detailed consideration of the system hydrodynamics and the major factors affecting differing algal/DO responses and key habitats (eelgrass, benthic animals) are necessary *before* one could make these determinations and select a defensible “sentinel station” to represent the nutrient management target for the system. That has yet to occur.

Regarding the selection of MHB16 as the “sentinel station” for the Taunton River estuarine reaches, the existing data and studies for the system would not support its use as a valid sentinel site, particularly as relates to the MEP program. First, the site does not appear to have any obvious relevance for predicting nutrient effects in the Taunton Estuary as it is far removed, has a large intervening basin (Mt. Hope Bay) with multiple inputs and differing structure, and is subject to far different stressors and physical constraints. Second, MHB16 was confirmed by other researchers to exhibit very different

hydrodynamic characteristics from the rest of the system, including Mount Hope Bay itself (See attached figures (Kincaid, 2006); see, also hydrodynamic analyses (Zhao, Chen & Cowles, 2006; Chen, Zhao, Cowles & Rothschild, 2008)). Also, this site in the Sakonnet River is not the dominant discharge channel from Mt. Hope Bay adding an additional confounding element. Consequently, the nutrient response at this site would not be representative of the expected response within the Taunton River estuarine reaches.

Thus, while, in my opinion, a sentinel station approach is valid for management of nutrient impacts, there are multiple factors that need to be taken into account before implementing this approach and selecting the location. Mount Hope Bay is a complex system with its own major inputs of which the Taunton River is but one (a big one certainly) as well exchanges with Narragansett Bay. Stratification is a major factor that broadly affects DO conditions throughout this system and that needs to be evaluated more thoroughly to understand the DO regime.

I hope that you may find these comments helpful. We look forward to helping Taunton, Brockton and other affected communities to resolve these complex issues. Let me know if I may be of any further assistance.

Sincerely,

A handwritten signature in blue ink, appearing to read "Brian L. Howes". The signature is written in a cursive style with a long horizontal stroke at the end.

Brian L. Howes, Ph.D.
Professor, SMAST-UMass Dartmouth
Technical Director Massachusetts Estuaries Project

Attachment

