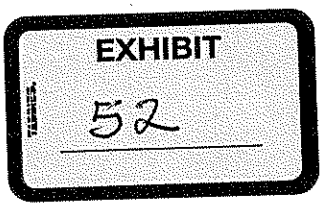
CME Associates, Inc.
32 Crabtree Lane, PO Box 849, Woodstock CT 06281
Phone: 860.928.7848 Fax: 860.928.7846

March 16, 2010

Paul Stacey
Director: Bureau of Water Protection & Land Reuse
Planning and Standards Division
Department of Environmental Protection
79 Elm Street
Hartford, CT 06106-5127



Re: Water Quality Standards, Public Comments

Dear Mr. Stacey:

I appreciate the opportunity to comment on the proposed revision to the Connecticut Water Quality Standards. I work in Connecticut as an environmental consultant and I also serve on the board of the Connecticut Federation of Lakes. My comments below tend to be technical and relate to specifics of the Water Quality Standards, generally I am submitting my comments to raise awareness for lake water quality.

1. I wish to start with a comment on the presentation file posted on CTDEP's website for these revisions (wqsrev_present.pdf). On slide 31 it is stated that "Phosphorus is NOT a threshold pollutant". I believe that the data on the accompanying graph depicts multimetric index (derived from benthic invertebrates) from low order streams versus phosphorus concentrations. There appears to be an inverse relation between total phosphorus and MMI score in this data although total phosphorus does not explain all the variability. I would like to caution against over interpretation of MMI data for streams in developing water quality standards for all fresh waters. Conditions in other freshwaters such as lakes and ponds or larger rivers may differ significantly from what is found in the smaller streams sampled in these studies.

Phosphorus has been shown to be a threshold pollutant in lakes. Although this was subject to some scientific debate over thirty years ago, whole lake eutrophication experiments dramatically showed phosphorus to be *the* threshold pollutant in lakes (Schindler, D.W. 1977. Science. 195:260-262). Connecticut is lucky to have a nearly 75 year history of lake water quality research and these lake survey datasets link increasing phosphorus concentrations with decreasing transparency. In some cases healthy aquatic life communities and recreational uses may be supported in highly productive waters; however, in other cases increased nutrient levels can lead to water quality degradation and promote harmful algae blooms. Lakes and ponds are valuable water resources in Connecticut; efforts to protect freshwater quality need to account for differences in conditions between waterbodies and waterways. Lake managers and watershed organizations have been working for decades to reduce phosphorus inputs to lakes including outreach and promotion for low or phosphorus free fertilizers. Downplaying the importance of phosphorus in freshwater hampers efforts to promote water quality and is not supported by scientific data.

32 Crabtree Lane, PO Box 849, Woodstock CT 06281
Phone: 860.928.7848 Fax: 860.928.7846

2. In addition to having a long history of lake research, Connecticut has a relatively long history of using watershed export modeling in water quality studies. These models are a great tool and will become increasingly practical with improving GIS and land use interpretation technology. Therefore, developing a nutrient reduction strategy based on these models is a good approach. I have a few words of caution about developing that approach for phosphorus. Watershed load modeling can be confounded by additional sources that are inaccurately attributed to the watershed. In particular for phosphorus, point sources and internal sediment recycling (internal loading) are conditions that may be a problem. Known point sources can be identified and quantified; however, internal loading can be more difficult to quantify. The studies used to develop land use cover type exports need to be examined to determine how the load calculations are derived. Studies that use in-lake conditions are able integrate variable inputs but may be prone to attributing internal loads to the watershed. Samples from streams may be less influenced by internal loading but tend to be highly variable and are difficult to integrate over an appropriate time scale. Internal recycling of increased phosphorus inputs may still result in non-attainment for lakes with watersheds that meet and exceed land-use condition requirements. There can be a significant lag between the reduced watershed load and lower phosphorus in lake water due to the retention of phosphorus in sediments. I recommend reviewing multiple studies when developing values for land use exports, particularly work in Connecticut and surroundings (see for example Field et al. 1996. *Estimating the Effects of Changing Land Use Patterns on Connecticut Lakes*. Journal of Environmental Quality 25:325-333.).

3. I understand it is difficult to develop numerical standard values for nutrients, particularly to generate values that are attainable yet not so high as to allow further degradation. There appears to be an inconsistency in how standards for phosphorus (non-numeric, watershed based) and sodium (numeric value, single concentration) are developed in Class AA waters. Sodium values vary throughout the state based on geology, distance from the coast and roadway deicing impacts. The argument used to develop watershed based standards for phosphorus appears to be equally applicable to sodium.

4. I recommend that the term 'cultural enrichment' be replaced with cultural eutrophication. Although there is a history of usage for both terms in this context, cultural enrichment is also often used in a completely unrelated context of learning about other cultures, and has the potential to be confusing. The term 'eutrophication' has a historical precedence for being used in the Water Quality Standards and connects back to the trophic states for lakes presented in the document.

5. In the definitions, coastal waters are defined as waters as having salinity of 500 ppm or more. In my experience the mapping of coastal waters extends to all waters with tidal action and includes tidal freshwaters with lower salinities. Due to the limited range of tidal freshwaters, 'head-of-tide' areas represent rare habitats and are important for conservation. I understand it is not the goal of the Water Quality Standards to develop unique classification for every condition; however, I recommend investigating a manner in which the Water Quality Standards could account for tidal freshwaters and require the lower of freshwater or saline standards in those waters when appropriate.

CME Associates, Inc.
32 Crabtree Lane, PO Box 849, Woodstock CT 06281
Phone: 860.928.7848 Fax: 860.928.7846

6. In the February 2, 2010 errata document posted on the CTDEP website, wetlands are defined as, *"Wetlands means wetlands as defined under sections 22a-28 and 22a-38 of the General Statutes and as defined under the 1987 Corps of Engineers Wetland Delineation Manual, as amended."* I recommend this definition be revised for clarity. Defining wetlands as areas that meet both Connecticut and Federal definitions would exclude wetlands that meet only soil criteria required under Connecticut regulation. Furthermore, the Corps Wetland Delineation Manual can provide methods for determining if areas meet the required soil, vegetation and hydrology characteristics to be considered wetlands. Areas that are found to be wetland by applying the methods of the delineation manual may not be Federally regulated under the Clean Water Act due to a lack of connectivity to navigable waters. Unless otherwise required, I recommend you choose one standard for your definition.

Thank you for considering my comments.

Respectfully,

Richard Canavan, Ph.D.
Senior Environmental Scientist