

From: John Hall

Sent: Friday, November 9, 2018 11:46 AM

To: Clark Freise <clark.freise@des.nh.gov>; Arsenault, Dan <Arseault.Dan@epa.gov>; Latimer, Jim <Latimer.Jim@epa.gov>

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Subject: RE: Latimer Working Responses

Importance: High

Dan/Clark/JIm

This response is most helpful and I think that it provides good path to resolve, at a minimum, the Piscataqua area impacts. It would be most helpful if Jim could provide input on the following questions:

TN loading and form of pollutant

Based on our understanding of what was done, the system TN loads that were plotted to determine area load factors (kg/ha-yr) were basically delivered from groundwater inputs. Nitrate from septic tanks would have been a key source for the calculated TN loads for the small watersheds evaluated. So while reported as "TN" the component, what was actually being assessed was dissolved (readily bioavailable) nitrogen forms versus potential submerged aquatic vegetation growth. If this is true, then adding particulate TN forms (chunks of plants) and dissolved organic TN (e.g. from decayed plant matter like CDOM) would not be an appropriate comparison of this paper to the GB system, which is dominated from river loadings that carry in these forms of TN that are far less bioavailable (CMOM is basically unavailable N).

Jim: Is dissolved, bioavailable a reasonable characterization of the form of TN that was used to populate the graphs for the areas considered given the modeling approach that was utilized to generate the load estimates?

River Dominated Systems

We understand that none of the areas used to populate the graphs were from river dominated systems. While we would observe that the entire GB system is river dominated (certainly as the loading source of TN, and from a transparency perspective due to the high CDOM and particulate load delivered which controls water clarity), it is obvious that the Piscataqua River segment of the estuary is "river dominated", as, it is, a river, not an embayment, pond or bay.

Jim: Do you concur that the 2010 paper is not reasonably applicable to the dynamics occurring in the Piscataqua River system (which, incidentally has high CDOM levels, very low phytoplankton growth and ~ 1 day detention time due to the extreme tidal exchange with the Gulf of Maine)?

Annual Average Loading

We understand that your paper employed annual average loading because the model that was employed to calculate the system loads, provided its output in that format. Moreover, as GW was the route of TN input, one would not have anticipated a significant seasonal load signature associated with the results so, whether you plotted only the amount of load occurring over the growing season (divide by two, plot same data) or annual average, the results would have looked the same.

Jim: Was there a biological reason for choosing annual average versus growing season? If not, do you concur that assessing GB inputs from a growing season load perspective is acceptable, so long as the appropriate adjustment is made to your loading estimates (i.e., divide by 2)?

That should do it.

Thanks,

John

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