

M e m o r a n d u m

To: Colleen Morgan, Tara Galloway, Bill Michaud
Marasco Newton Group

From: Eric Adams

Subject: Preliminary Review regarding Housatonic River MFD

Date: April 18, 2001

The response to my earlier questions (and the questions of others) has been quite helpful. Following are preliminary comments on the MFD.

General comments

- There is a lot of strength behind this project. The suite of chosen models is quite sophisticated, the modeling team and their consultants appear experienced, they have diligently addressed a broad array of questions, and they have assembled and/or are planning to collect a lot of field data.
- Having said that, this seems to be a major undertaking. The effort to interface, then calibrate and validate three models to an acceptable level of accuracy, could be very time consuming. (This judgment is based on my participation as a member of a similar model evaluation group overseeing modeling in Boston Harbor/Mass Bays which has lasted over 9 years, as well as a general familiarity with modeling efforts at a number of other sites.) Hence I worry if acceptable results can be obtained on time. However, I remain cautiously optimistic and look forward to viewing model results.
- I would like to see the model domain extended further upstream. I realize, as the team reiterated in their response to my question 4, that the present focus is the region between the confluence and Woods Pond. However, the ongoing/proposed remediation in the upper 2 miles above the study area would provide a good basis for model/data comparison. Can the models predict the (presumably substantial) decrease in PCB loading arriving at the confluence following remediation? This will likely be a much bigger perturbation (hence more valuable test of model skill) than the changes that have occurred in the approximately 20 year period used for calibration/validation. It would also parallel one of the potential mitigation options that could be chosen for the study area.

- Similarly, while the generally lower PCB concentrations downstream of Woods Pond imply that this region is less important from a human and ecological health standpoint, valuable data have been collected, and it would be nice to see if the model can predict them. Demonstrated skill in properly predicting these downstream concentrations can be used to assert confidence in model predictions upstream of Woods Pond, including conditions after mitigation when PCBs loadings in that region will also be smaller.
- One objective of the study is to assess natural recovery. The two-year calibration period is useful to assess model skill in simulating processes, but too short to see much natural recovery, as the team concedes in their answer to my question 3. I wonder if a larger portion of the 20-year study period should be devoted to calibration rather than validation, or if additional data (GE or earlier EPA) should be used?

Watershed modeling/HSPF:

- Most of the PCBs are in flood plain areas on the fringe of the various sub-watersheds. It is not clear to me whether these PCBs are more likely to enter the river by erosion from an occasional flood (a process handled by EFDC) or by wash-off from more frequent river and snow runoff (a process assigned to HSPF).
- HSPF is a lumped parameter (0 dimensional) model, in the sense that it does not spatially discretize each sub-watershed. I suspect this is adequate for purposes of predicting water and perhaps sediment run-off, but I question if it is effective in predicting PCB wash-off from runoff, given that the PCB-laden sediments are concentrated in such a small portion of each sub-watershed.

River modeling/EFDC:

- EFDC is a generalized 3-D hydrodynamic/transport code, and not a river model *per se*. Along with some of the other panel members, I am concerned about the lack of previous applications to predict erosion and transport in complex channels and the possible need to engage in code enhancements in the middle of a tight schedule.
- It is unfortunate that there are not good data available for establishing initial bathymetry. The plan to use bathymetry and subtract sediment deposition inferred from Be-7, Pb-210, Cs-137 seems reasonable under the circumstances, but it is not predictive.

Chemical fate and effects/AQUATOX

- This model will be run with a daily time step. The response to my question 23 clarifies that the computational time step can be subdivided (based on an adaptive time-stepping algorithm), but the loads will be aggregated. Since storms are so important for transport, it is not clear if daily aggregation will be adequate.