Wilbert Lick Questions

This first set of questions is about the sediment-water flux of PCB. The questions are more-or-less related. I have only read through section 4 so that some of the questions may be answered later in the report.

1. Table 4.1-2. Mixing rates are in units of 10^{-9} m/s. Is this a mass transfer coefficient (m/s) or should the units be 10^{-9} m^2/s (a particle mixing or diffusion coefficient)? On p. 4-14, line 12, reference is made to a mixing coefficient of 10^{-9} m^2/s.

2. p. 4-14, line 16. "Evaluation of mixing rates (subduction velocities)…." Is it mixing rates or subduction velocities? They're not the same by the usual definitions.

3. If it's a particle mixing coefficient or whatever, what is it used for? The assumption in the analysis is that the mixed layer is "thoroughly mixed", which I assume means completely and instantaneously mixed (an infinite diffusion coefficient).

4. p 4-14, line 23. "Based on abundances and biomass density, the …." Where is the data for this statement and all statements about this subject? Not the raw data, but at least some summary.

5. p. 4-15, line 24. "Mixing rates applied across the interface between sediment layers are summarized in Table 4.1-2." Mixing rates in Table 4.1-2 are listed for each layer. How does this apply to mixing rates between layers?

6. What is the value of the mass transfer coefficient for the flux of PCB between the sediment and overlying water? Previously you had given a value of 1.5 cm/day. Is this still the value used? Does it (or should it) vary over the length of the river? Should it depend on the numbers and types of organisms? How is this number related to the mixing rate (subduction velocity)?

Doug Endicott Questions

Example Model Simulations: Can more simulation results be provided? For example, EFDC predictions of TSS, and water column and sediment PCB concentrations as functions of time and river location. Same request regarding food chain model predictions?

Revised Upstream Boundary PCB Loading/rating Curve: Are the discontinuities in the log-log relationships between boundary PCBs and flow simply empirical fits of the data, or is there some rationale (i.e. conceptual model) to support this treatment? Why do you believe that particulate PCB concentrations did not exceed 25 ppm? There seem to be higher concentrations both within and above the PSA?

Bank Erosion: Could you provide more information to help us understand how solids and PCB loads from bank erosion vary as a functions of river flow? Maybe this could be done in the same manner that bed load is represented in Figure 4.2-63, Figures 6.2-15 thru –18, and Figure 6.2-39?

Initial PCB Conditions and Rate of Sediment Decline: I think you initialized PCB sediment concentrations by using the model's predicted rate of decline to extrapolate the1999 data backwards in time. Did you check whether the model predicted the <u>same</u> rates of decline, after doing this extrapolating of initial conditions?

Low-Concentration Bias in TSS and PCBs: Is it safe to ignore or discount the bias in model predictions under low-flow conditions? Is there some way that information could be used to improve the model?

Food Chain Model Calibration: In Figure 4.3-7, you use the sample standard deviation to represent the variability in measured PCB concentrations. Why didn't you use the 95% confidence limits (or ± 2 standard errors), since this better quantifies the measurement precision?

Uncertainty (RSM Model): Can you define the variables used in Table 5.2-8?

FCM Uncertainty: Would it be appropriate to include parameter correlations in the uncertainty analysis? In my own experience, this can significantly reduce the dispersion of the Monte Carlo output distributions, which you indicate is in some cases (e.g. largemouth bass) excessively large?

EFDC Validation: It was disappointing to see how little use was made of the bed elevation change data in the EFDC sediment transport validation (pages 6-52 thru 6-54). You offered the rationale that much of the observed net erosion or deposition was subgrid-scale phenomena. Unfortunately, this means that one of the most direct measurements of sediment transport dynamics cannot be used to test the model. Had you known of this outcome in advance, would you have made different decisions regarding model grid resolution?

Woods Pond Sedimentation Rate Data vs. Predicted Accumulation: This comparison (page 6-54 and Figure 6.2-34) also seems to undervalue the data. There are many EFDC grid cells in Woods Pond, and a significant number of dated sediment cores. Yet, the only comparison being presented is in terms of pond-wide average sedimentation rate. Does Figure 6.2-34 show that EFDC does a good job of reproducing the pattern of sedimentation rates? What would an x-y plot of predicted vs. measured sedimentation rates at the coring locations look like? If EFDC is not doing a good job, why not? Is this another subgrid-scale phenomena?

Censoring of Low-Flow TSS and PCB Data:

Bounding Analysis (p. 6-87): I think this could be very helpful for our understanding of how the models link to one another, but some further information is needed. Please show the specific results of the bounding analysis that are summarized here, including the sensitivity of individual

fish species to zeroing the water column PCB concentrations. Also, is this a result based upon modeling the entire validation period, or just a selected time interval?

John List Questions

Could we have Figure 2-2 with confidence limits imposed on the bar graphs?