

From: Jonathan Clough [mailto:jclough@warrenpinnacle.com]
Sent: Wednesday, March 12, 2014 7:04 AM
To: Dick Park; Troy Smith
Cc: Pete Wagner; Marge Coombs Wellman
Subject: RE: AQUATOX Calibration Comments

Hi Troy:

I'm traveling this week and therefore not going to have the chance to be as verbose as Dick has been. This review was on my calendar for Monday and while I spent time with the calibration report that day, ultimately I did not manage to complete the larger memorandum that I had envisioned.

That being said, I agree with everything that Dick has said below. I cannot see how the process could have been made more transparent and Darcy really did an excellent job putting the model through its paces. The documentation is thorough and clearly written. Darcy spent the time required to understand how the model works and produce the best possible calibration given the very complex system that is being modeled.

The modeling goal was a difficult one, given the variety of complex factors that can affect periphyton fate (nutrient effects, water-velocity scour, substrate quality, etc.). Given those factors, this model does an excellent job at predicting the overall quantity of periphyton throughout the river. Earlier in this process, I ran a limited validation of Darcy's model with historical data (that the model was not calibrated against) and it performed well. In sum, I believe this model meets the modeling goals that it was set out to achieve.

Best of luck at the meeting tomorrow! -- Jonathan

At 08:11 AM 3/11/2014, Dick Park wrote:

Troy,

As one of the developers of the model, I have read the draft report on the AQUATOX model calibration dated 2/26/2014, which included clarifications based on comments from the LBWC TAC meeting earlier in the day. I understand that the Watershed Council will vote on its acceptance this coming Thursday. As you requested, I have considered several aspects of the calibration and documentation:

- DEQ's process of calibrating the model has been deliberate and thorough; I speak from experience because I participated in one phase of the calibration and I saw how Darcy Sharp took my calibration and continued to improve it to obtain the final implementation.
- DEQ's report is an outstanding example of detailed documentation of all phases of the model setup and calibration; the transparency of the process should meet the highest standards for regulatory use as specified by the US EPA's Council for Regulatory Environmental Modeling.
- DEQ's model calibration should provide a high-quality quantified tool to be used in a weight-of-evidence approach for assessing the Lower Boise River TMDL.
- The biggest source of uncertainty has been the sparseness of data on algal biomass during the time period being simulated; however, DEQ has incorporated historic data in the analyses and has plans to use additional data as they become available.

I observed the presentation to the TAC, and I listened to the comments following that presentation. I believe all the comments were quite positive with the exception of one vague reference, which seemed

to be from a consultant to a stakeholder group.

In conclusion, I believe this effort is an outstanding example of calibration and documentation of a mechanistic-based ecosystem model applied to a complex river system subject to both effluent from numerous wastewater treatment plants and agricultural runoff carried by irrigation return flow. DEQ is to be commended for the tremendous effort and attention to detail represented by this report.

Dick Park

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