Central Florida Water Initiative

CFWI Water for Tomorrow

MEETING SUMMARY

Subject: Peer Review Teleconference – Meeting 16 (Review of Transient Calibration)

Expanded East Central Florida Transient (ECFTX) Groundwater Model

Date: August 15, 2019 (1 PM to 4 PM)

Prepared By: Central Florida Water Initiative (CFWI) Hydrologic Analysis Team (HAT)

Attendees:

Panel Members: Pete Andersen (Chair), Lou Motz, Mark Stewart

Districts and FDACS staff: Pete Kwiatkowski, Uditha Bandara, Jeff Giddings, Anushi Obeysekera, Clay Coarsey, Fatih Gordu, Wei Jin, Chris Leahy, Tammy Bader, Claire Muirhead, Chris Leahy, Lou Donnangelo, Lori Burklew, Ron Basso, Jason Patterson, Hua Zhang, Saashen Sealy, Brian Starford, Stacey Adams, Angela Chelette, Kathleen Greenwood, Kym Holzwart, James Hollingshead, Rahul Chatterjee

Utility Representatives: Brian Megic, David MacIntyre, Chris Russell

General Public: Prashanth Khambhammath, Angel Martin, Doug Hearn, Ron Stewart, Marc Killingstad, Ed Carter

The purpose of this meeting was to present to the Peer Review Panel the Districts' update to the transient calibration results for the ECFTX Model. NOTE: PowerPoint slides for the presentation made at the meeting have been posted to SWFWMD's peer review web board. In addition, structure flow calibration, calibration statistics, and the "shiny app" means of displaying these statistics spatially is also available at the web board.

Pete Kwiatkowski (PK) welcomed the meeting participants. Ron Basso (RB) presented the agenda and began the discussion of team efforts since our last meeting. RB discussed the scope of work for the Peer Reviewers, and a refresher of the model's essential features. Since our last meeting, he noted that staff made minor adjustments and achieved our calibration

targets. Subsequent to that, a predictive scenario was conducted that revealed an anomaly with respect to layer 8 leakance and transmissivity values of the Lower Floridan Aquifer (LFA) in the southern half of the SWFWMD, which was then corrected. A more recent predictive scenario revealed some anomalous General Head Boundary (GHB) fluxes that staff attempted to address. RB restated the Districts' and peer review panel's choice of simulating boundaries with GHBs and equivalent freshwater heads (EFHs) at the 10,000 mg/L TDS interface in each layer, and that some HAT members thought a no-flow boundary conceptualization was more appropriate. Lou Motz (LM) did not agree with the no-flow boundary approach and suggested that boundaries do move or provide water in response to pumping and the GHB approach simulates this while the no-flow approach does not. Pete Andersen (PA) suggested that potentiometric surfaces should be used to set GHB fluxes but recognized that not a lot of LFA data exists and our understanding of these boundaries is poorly defined. RB indicated that staff improved GHB fluxes by making trial-and-error changes to GHB conductance and aquifer parameters such as reducing Layer 10 vertical hydraulic conductivity. PK noted that adjustments were made to ensure that:

(1) fluxes in aquifers were higher than in confining units on a relative basis
(2) inflows from boundaries known to be brackish/saline were significantly reduced so that they could not be confused as a source of freshwater that could satisfy water demands and
(3) outflow in Layer 11 was more reasonable (i.e., lower).

Once the GHB fluxes were reasonable, staff adjusted aquifer parameters (e.g., Layers 3 and 5 hydraulic conductivity near their eastern boundaries) and achieved statistical calibration. PA noted that the RMS error improved, and staff may have fixed an outlier. Regarding the September 2004 flooded cells map, PK noted that we previously addressed this issue, and it was decided that the changes needed to reduce the number of these flooded cells in this anomalous post-hurricanes month would adversely affect the calibration in the other months so no change was made. PA agreed that the flooding was not an issue if the level of flooding shown was only for the one month that had experienced several hurricanes. It is likely that the amount of precipitation for this month was outside the range of accurate computations using the recharge algorithm.

At PA's request, RB noted that the predictive scenarios like 2040 include running the 2040 water demands along with the 2003 through 2014 climatic conditions. For the comparison of 2014 to 2040 with an increase of 458 mgd in groundwater withdrawn, reduction in outflows is to be expected.

David MacIntyre noted that while he agreed with LM as a general statement on boundary conditions, he noted that no-flow boundaries can be considered appropriate if one can demonstrate that the position of the freshwater-saltwater interface has been relatively stable over the decades under conditions with varying groundwater pumping. He indicated that a previous simulation indicated 40 percent of the 2040 water demand changes compared to 2014

was being satisfied by the flux changes at the GHBs. He acknowledged that it is difficult to determine an appropriate number regarding the flux rate at a particular layer, but the model drawdown results appear sensitive to the assigned values, which is why he has been concerned.

PA asked whether there were any changes in streamflow, and Jeff Giddings indicated none were noted. Mark Stewart (MS) noted our understanding on calibration parameters is known over a broad spectrum, with some parameters well known (e.g., aquifer parameters) while others (e.g., baseflow) are not. He noted that overall the calibration slightly improved statistically and the GHBs are now more in keeping with our general understanding of the flow system. He indicated that overall we've advanced the calibration in the appropriate direction. LM indicated that we've made significant progress. He noted that boundary conditions are often difficult to quantify accurately and agreed with PA that the GHB boundaries should not be significant sources of water in the model. He indicated that overall we're on the right track. The overall water budget for calibration was presented, but we should do so for the predictive scenarios beyond just the changes in GHB flows that had been presented. RB indicated that this budget information would be provided as supplemental material posted to the web board.

PA wanted to ensure that the model effectively simulates the transient response, especially that the model is simulating the minimums and maximums, as major water resource decisions rely on a model's ability to capture them. RB replied that the transient character of the model calibration had not changed significantly from the December 2018 version. He noted a link to the shiny app was sent to the peer review panel to further assess the transient nature of the calibration. WMD staff would look for ways to further demonstrate the robustness of the transient calibration in the draft report.

Panel members summarized that staff have looked at anomalies and have appropriately resolved them. Water budgets are essential, and while the GHB fluxes are important, in this case they are small compared to the other water budget terms. Models are always a work in progress, but staff have satisfactorily resolved concerns, and at this point, the model is ready to be used and the documentation initiated.

PK indicated that it would likely take a couple of months to develop the first draft of the model documentation. MS indicated a desire to allow one month for the Panel to review the draft document. RB indicated that it might be advantageous to have a face-to-face meeting to resolve their future comments on the model documentation once received.

Public Comment

Angel Martin suggested that staff look at the SWFWMD's Northern District Model to compare fluxes. RB answered that the Northern District Model was mostly aligned along natural no-flow divides in the system and that it covered a much smaller footprint of the larger 25,000 square mile ECFTX domain. RB answered staff reviews larger regional scale models to generally compare boundary flux magnitude as a test of reasonableness. Angel Martin asked if staff had

looked at making boundaries no-flow, and staff noted that this was investigated as part of the sensitivity analysis.

Adjourn - The meeting was adjourned at 4:15 pm.