



# Baylor University

Mr. Woody Frossard  
Environmental Division Director  
Tarrant Regional Water District  
800 East Northside Dr.  
Fort Worth, Texas 76102

Dear Mr. Frossard,

It was a pleasure to review the documents forwarded by your staff on the planned discharge into Mary's Creek in the City of Fort Worth. At your request, I have reviewed the modeling work with particular reference to the potential for the new discharge to create water quality conditions that may cause harmful algal blooms (HABs). Given that these results conservatively estimate that total phosphorus (TP) and dissolved inorganic nitrogen (DIN = NO<sub>x</sub>-N + NH<sub>4</sub>-N) concentrations in Mary's creek are likely to increase to levels of 0.06 mg/L and 3.5 mg/L, respectively, there is justified concern for a likely increase in the frequency and magnitude of potentially toxic HABs. Research over the last decade has indicated that nitrogen concentrations, in addition to phosphorus, have an important role in fueling HABs (Gobler et al. 2016, Paerl et al. 2016). Our recent research at Baylor University is confirming this idea. For example, we recently demonstrated that toxin production by a strain of the blue-green algae *Microcystis* increases when nitrogen availability is high relative to phosphorus (Wagner et al. 2019). Your organization has data confirming that the genus *Microcystis* occurs in these waters (M. Ernst, personal communication) and your modeling results mentioned above specifically indicate that the elevated nutrient concentrations from the discharge will have a high proportion of nitrogen relative to phosphorus.

I use the term conservative to describe the outcomes presented by TRWD from the QUALTX modeling effort because the choice of rate constants used in the model to derive the results mentioned above were based on empirical values taken from a TRWD regional tracer/synoptic study. Indeed, the range of acceptable rates that could have been used in this modeling exercise would have yielded concentrations that were more than 2x higher. Importantly, these conservative modeling assumptions still suggest the potential for a problem with toxic HABs.

Please let me know if you have any questions about my assessment of this work.

Sincerely,

J. Thad Scott, Ph.D.  
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Center for Reservoir and Aquatic Systems Research  
Department of Biology  
Baylor University  
Waco, Texas