TRUNGALE ENGINEERING & SCIENCE

To: Texas Commission on Environmental Quality

From: Joseph F. Trungale, P.E.

Date: 8/19/2010

Re: Senate Bill 3 Rule making process

As a member of the Trinity-San Jacinto BBEST, I appreciate the opportunity to provide comments to the TCEQ regarding the development of environmental flows rules. In addition to my participation on the BBEST, I have contributed to a number of the SAC guidance documents and been active on several SAC workgroups including the instream biology workgroup, that provided guidance on the application of biological information to the development of flow recommendations, and the hydrology workgroup, that has been considering SB 3 implementation, attainment of environmental flow targets, impact on water management strategies, and use of WAMs.

The merits of the various BBEST/BBASC recommendations and some of the lessons learned from this process have been addressed at some length in other forums. I would urge the TCEQ to refer to the reviews provided the SAC and the TPWD when considering the recommendations produced in compliance with the SB 3 legislative mandate. My comments are focused on two issues that I believe are of particular importance to the TCEQ. The first has to do with balancing the compliance of meeting the flow recommendations with impact on water supply yield. The second issue has to do with defining a set aside and specifically the need for attainment targets and an approach to implement these recommendations as part of the rule making process. The hydrology workgroup has made significant progress on these issues. A reasonable approach is to employ a daily reservoir operations model, similar to the one included in the Sabine Neches BBEST report, to calculate project yield and pass through flows required to meet environmental needs. The outputs from this daily analysis can then be incorporated into the existing monthly WAM models. Ultimately incorporating these steps into a daily WAM would be desirable. While there may remain some details for further discussion, the hydrology workgroup has overcome most of the major technical challenges.

Balancing water supply and environmental flows

When considering the impact of the SB 3 environmental flow recommendations on water supply yield, the appropriate baseline to compare against is the yield that would be expected given the existing regulatory guidance. In the analysis produced for the Sabine River Authority, the AECOM model describes the "no environmental flow" alternative as the base model. To suggest that this alternative represents a baseline is inappropriate, as it is unreasonable to suggest that a major reservoir would be developed with no environmental flow protections. In evaluating new water supply projects, the standard approach is to develop a "no action

alternative". A "no action alterative" represents project under the assumptions of the status quo. The TCEQ should evaluate impacts on water supply yield relative to those that would be expected assuming environmental flows required by planning and permitting default targets (Consensus Criteria and Lyons). It is important to emphasize that these defaults are only intended as place holders, and that a comprehensive instream flow study is necessary to evaluate large water supply projects. Nonetheless these defaults offer more reasonable "no action" baselines against which to compare. The hydrology workgroup has been evaluating the yield of a proposed reservoir on Big Sandy Creek in the Sabine Basin as an example application to evaluate the impacts of the SB 3 flow recommendations on project yield. Preliminary results assuming four environmental flow alternatives are shown in Table 1.

Table 1 Reservoir Yields assuming different e-flow targets.

Flow Requirements Alterantive	Yield
No ISF Targets	39,112
Lyons (permiting placeholders)	26,525
Consnsus Criteria (planning placeholders)	29,074
BBEST Recomemndation	28,800
% change in yield due to adopting BBEST recs	8.6%

Based on this analysis, the adoption of the SB 3 recommendations for this project would have a positive impact on project yield relative the "no action alternative" default Lyons method. Implementation of the SB 3 recommendations results in a yield of 28,800 ACFT per year while implementation the Lyons target produces a lower yield of 26,525 ACFT per year. Other analysts have reached similar findings in evaluation of other proposed reservoir projects; namely that the SB 3 recommendations have less impact on new project yield than the current Lyons default targets.

Flow Standard

In addition to the values in the flow matrices provided by the two BBEST reports and the one BBASC report that included a flow recommendation, a flow standard should include attainment targets and an implementation approach, including triggers to define hydrologic conditions and rules to define when high flow pulses are met. (TCEQ should consider this issue in the context of the water rights permitting based on long term WAM simulations.) The Trinity-San Jacinto groups included attainment targets but not an implementation approach while the Sabine-Neches BBEST did the opposite (though it has been suggested that the SN-BBEST implicitly defined attainment targets via their implementation approach). It is important to have both of these defined so that in balancing water supply with environmental flow protection, it is possible to both calculate yield, by conducting a reservoir simulation, and to have a benchmark against which to evaluate flows resulting from that simulation. Needless to say it is necessary that in addition to reporting yield (which has thus far been the focus of the hydrology workgroup), any simulations of proposed projects should report compliance of the flows

resulting from the implementation of a given water management strategy with the SB 3 recommendations. (Similar to the product produced by the TWDB for the Trinity-San Jacinto BBASC.) This would facilitate a consideration of trade-offs between yield and instream flow protection.

Specific Issues

Trinity-San Jacinto (TSJ) - An approach similar to the example application provided by the SN-BBEST for implementation of the SB 3 flow recommendations should be developed for the TSJ. In the TSJ, the challenge will be to find appropriate triggers to more closely mimic the recommended attainment goals. The TCEQ will have a greater chance of success with this effort if the triggers are based on naturalized flows rather than on reservoir storage. This will present a challenge in terms of real time implementation of the recommendations but would work fine in the WAM permitting context.

Sabine-Neches (SN) - Attainment targets need to be defined for the SB 3 flow recommendations. It could be argued that the SN-BBEST did implicitly provide attainment goals via their implementation program. While they did not explicitly report or recommend attainment targets, the frequency of meeting the various targets assuming the implementation example, that was deemed satisfactory for protecting the environment, can easily be calculated. There are a couple of problems with this view. First, this would be a case of implementation defining what was to be a strictly science based flow regime. The SB 3 statue clearly prohibits this. Although the SAC did not say this exactly, they do allude to this problem in their comments on the SN-BBEST report. Second, this post facto analysis is not a very transparent one and may not result in satisfactory frequencies of the various flow components. The frequencies of meeting the various targets based on historical flows, a "no environmental flows" alternative, and an application of the example implementation of the SB 3 recommendations provided by the SN-BBEST are provided in Table 2. While the BBEST example implementation closely mimics the attainment frequencies for lower (dry) base flows, it results in significantly less frequent higher (wet) base and pulse flows. Had this type of analysis been explicitly performed by the SN-BBEST, the members of that team with expertise in fluvial ecology might have more carefully scrutinized these results and questioned this implementation approach. TCEQ should consult with individuals with this expertise to help develop the necessary attainment targets based on the ecological needs of the system.

Table 2 Comparison of attainment of meeting environmental flow targets.

Base

Season	Subs	Low	Med	High
Winter	20	66	106	163
Spring	9	30	51	111
Summer	8	14	18	26
Fall	8	20	36	63

Base Flow Targets Percent Excedence

	Gage				No ISF				BBEST				Gage vs No ISF				Gage vs BBEST			
Season	Subs	Low	Med	High	Subs	Low	Med	High	Subs	Low	Med	High	Subs	Low	Med	High	Subs	Low	Med	High
Winter	100%	89%	74%	55%	60%	48%	42%	33%	100%	87%	65%	38%	-40%	-46%	-44%	-41%	0%	-3%	-12%	-31%
Spring	100%	91%	79%	54%	80%	50%	44%	33%	99%	89%	68%	38%	-19%	-45%	-44%	-40%	0%	-3%	-14%	-30%
Summer	96%	82%	71%	52%	79%	42%	25%	13%	93%	76%	61%	30%	-18%	-49%	-64%	-75%	-3%	-8%	-14%	-42%
Fall	99%	90%	72%	50%	86%	35%	21%	15%	99%	87%	61%	31%	-13%	-61%	-71%	-71%	0%	-3%	-15%	-38%
All Months	99%	88%	74%	53%	76%	44%	33%	23%	98%	85%	64%	35%	-23%	-50%	-56%	-56%	-1%	-4%	-14%	-35%

Pulse

Magnitude

Season	2ps	1ps		OB
Winter	358	942		2,930
Spring	313	950		
Summer	50	132		
Fall	130	367		

High Flow Targets Percent Excedence (Mag only)

	Gage				No ISF				BBEST				Gage vs No ISF				Gage vs BBEST			
Season	2ps	1ps		OB	2ps	1ps		OB	2ps	1ps		OB	2ps	1ps		OB	2ps	2ps		OB
Winter	63% (78%)	61%		42%	53% (61%)	51%		31%	54% (69%)	47%		27%	-16% (-22%)	-17%		-28%	-14% (-11%)	-22%		-36%
Spring	69% (83%)	66%			54% (75%)	61%			54% (85%)	54%			-22% (-10%)	-8%			-22% (2%)	-18%		
Summer	53% (78%)	49%			19% (54%)	22%			34% (68%)	29%			-65% (-30%)	-55%			-35% (-13%)	-41%		
Fall	68% (80%)	59%			29% (46%)	39%			41% (66%)	46%			-58% (-43%)	-34%			-40% (-17%)	-23%		

Finally, while the above comments are my own, I believe all of the scientists who made up the so called "regime group" would welcome the opportunity to support the TCEQ in this effort and would appreciate the opportunity to provide additional input into this process.

Sincerely

Joseph F. Trungale, P.E.