March 19, 2010

The Honorable Kip Averitt, Co-Chair
Environmental Flows Advisory Group
P. O. Box 12068 – Capitol Station
Austin, TX 78711

The Honorable Allan Ritter, Co-Chair
Environmental Flows Advisory Group
P. O. Box 2910
Austin, TX 78768-2910

Dear Senator Averitt and Representative Ritter:

The Basin and Bay Expert Science Teams (BBESTs) for the Trinity/San Jacinto/Galveston Bay area and the Sabine/Neches/Sabine Lake area have completed their respective environmental flow recommendation reports as scheduled on November 30, 2009. These two reports were submitted to the Environmental Flows Advisory Group (EFAG), the Texas Commission on Environmental Quality (TCEQ), and their respective Basin and Bay Area Stakeholder Committees.

It is clear from the two reports that the BBEST members have devoted substantial effort to this important task pursuant to their charge as stipulated in Senate Bill 3. The state can be proud we have so many scientists willing to participate in this program.

Attached are review comments prepared and adopted by the Texas Environmental Flows Science Advisory Committee (SAC) pursuant to Texas Water Code **Sec. 11.02362(q)**, as added by Senate Bill 3 in the 80th Texas Legislature, 2007. The statute calls for the SAC to provide input to the EFAG for its use in reviewing the BBEST environmental flow analyses and environmental flow regime recommendations. The attached reviews reflect the general consensus of the SAC members. Should the advisory group deem it appropriate to submit comments to the TCEQ, the SAC trusts that you will find the enclosed reviews helpful. We stand ready to support your preparation of comments in any way you deem appropriate.

Sincerely,

Robert J. Huston
SAC Chairman

CC: Danny Vance, Trinity/San Jacinto/Galveston Bay Area Stakeholders Chair
Jerry Clark, Sabine/Neches/Sabine Lake Area Stakeholders Chair
Dr. William Espey, Trinity/San Jacinto/Galveston Bay BBEST Chair
Jack Tatum, Sabine/Neches/Sabine Lake BBEST Chair

Memorandum

To: **Environmental Flows Advisory Group**
From: **Texas Environmental Flows Science Advisory Committee**
Date: **March 17, 2010**
Re: **Review comments on Trinity and San Jacinto Rivers and Galveston Bay Basin and Bay Expert Science Team Environmental Flows Recommendations Report dated Nov. 30, 2009**

Preface

The Trinity and San Jacinto Rivers and Galveston Bay Basin and Bay Expert Science Team (BBEST) has submitted its environmental flow analyses and environmental flow regime recommendations to its Basin and Bay Area Stakeholders Committee (Stakeholders), the Environmental Flows Advisory Group (EFAG) and the Texas Commission on Environmental Quality (TCEQ). Texas Water Code **Sec. 11.02362 (q),** as added by Senate Bill 3 in the 80th Texas Legislature, 2007 (SB 3), provides that "In accordance with the applicable schedule...the advisory group, with input from the science advisory committee, shall review the environmental flow analyses and environmental flow regime recommendations submitted by each basin and bay expert science team. If appropriate the advisory group shall submit comments on the analyses and recommendations to the commission for use by the commission in adopting rules under Section 11.1471. Comments must be submitted not later than six months after the date of receipt of the analyses and recommendations." This memorandum summarizes the Science Advisory Committee's (SAC) input to the EFAG based on our review of the BBEST report.

Other potentially relevant provisions of the law, as added by SB 3, which influence and guide the preparation of the SAC's input include:

- **Sec. 11.02362 (n):** "Each basin and bay expert science team [BBEST] shall submit its environmental flow analyses and environmental flow regime recommendations to the pertinent basin and bay area stakeholders committee, the advisory group [EFAG], and the commission [TCEQ]..... The ...advisory group may not change the environmental flow analyses or environmental flow regime recommendations of the basin and bay expert science team."
- **Sec. 11.02361 (e):** "The science advisory committee [SAC] shall (1) serve as an objective scientific body to advise and make recommendations to the advisory group on issues relating to the science of environmental flow protection..."
- **Sec. 11.002 (15)** "Environmental flow analysis" means the application of a scientifically derived process for predicting the response of an ecosystem to changes in instream flows or freshwater inflows.
- **Sec. 11.002 (16):** "Environmental flow regime" means a schedule of flow quantities that reflects seasonal and yearly fluctuations that

typically would vary geographically, by specific location in a watershed, and that are shown to be adequate to support a sound ecological environment and to maintain the productivity, extent and persistence of key aquatic habitats in and along the affected water bodies.

- **Sec. 11.02362(m):** "...In developing the [environmental flow] analyses and [environmental flow regime] recommendations, the science team [BBEST] must consider all reasonably available science, without regard to the need for the water for other uses, and the science team's [BBEST's] recommendations must be based solely on the best science available."

The timeframe dictated by SB 3 presents a significant challenge to the BBEST. They have only 12 months from their appointment to organize themselves, develop their agenda for addressing the requirements placed on them under the statute, conduct their analyses and report their results.

It is clear from this BBEST's report that the collaborative process designed to achieve a consensus, as envisioned in SB 3, broke down. The only consensus reported was (i) that the Trinity/San Jacinto/Galveston Bay system is currently considered to be a "sound ecological environment", (ii) pre-development hydrologic records should be used in hydrology-based environmental flow calculations, and (iii) that each of the BBEST split positions on environmental flow recommendations would be reported to their Stakeholders, EFAG and TCEQ. From that point, the BBEST reported two distinct sets of environmental flow recommendations, each endorsed by approximately one half of its members. It is important to note that all of the members of the BBEST worked very hard and spent countless hours on their analyses. Given the level of effort and commitment, it is disappointing that the group failed to achieve a greater level of consensus.

The late attempts by this BBEST to reach consensus, followed by the decision to present two alternative sets of recommendations, resulted in a report that is not well organized, and hence is difficult to digest. In particular, the substantial set of comments from BBEST members had to be integrated with the body of the report to understand the positions taken by each group. Furthermore, the BBEST did not appear to follow a plan to reach consensus, even though one was implicit in the series of estuary workshops that were conducted. Throughout the course of the work, there seemed to be difficulty in making interim decisions that were not constantly being revisited. The outcome of this BBEST process demonstrates the need for a clear work plan with specific decision points to facilitate reaching consensus within the allotted SB3 time period.

SAC Review Comments

In preparing our remarks, the SAC concluded that even though the BBEST (as a whole) did not produce a consensus-based recommendation, a review of the two alternatives recommendations will be useful as the Stakeholders and TCEQ proceed with their SB 3 responsibilities. Although it could be argued that since there was no consensus-based recommendation from the BBEST, no review would be appropriate from the SAC.

However, that position was not elected as it would fail to advance the overall SB 3 process. Finally, while it might be feasible (and tempting) for the SAC to compare and potentially even reconcile the two sets of instream flow recommendations which are reported, it would be inappropriate to consider such a "consolidated" environmental flow regime to be the BBEST recommendation. Clearly such a consensus recommendation was not offered by the BBEST.

The two subgroups of the Trinity/San Jacinto/Galveston Bay BBEST entitled their respective recommendations as the "Science-Based Conditional Phased Approach" and the "Science-Based Environmental Flow Regime". Throughout the remainder of this memorandum, we will refer to the two approaches as the Conditional and the Regime approach, respectively.

To facilitate and organize the SAC review of the BBEST product, we developed a framework of over-arching questions in which we intend to capture the principal requirements that SB 3 presents to guide the work of the BBEST. The review embodied in this memo follows that framework. While the SAC found it reasonable to subject the Regime group's recommendations to the full set of questions included in our framework, it was the SAC's opinion that the Conditional recommendations failed to meet the minimum requirements of an environmental flow regime as defined by the statute. While the report is somewhat unclear, the four-station, limited environmental flow regime values (subsistence, low-base, and overbank flows) are offered as "recommendations" by the Conditional group. Their additional gage locations and higher flow values are emphatically **not** presented as recommendations. The Conditional group also depended very heavily, and inappropriately from the SAC's viewpoint, on the adaptive management provisions in the statute. They suggest that their limited recommendations can be considered by TCEQ in permitting, but make no mention of how the Stakeholders can develop standards to recommend to TCEQ for rulemaking. Hence, much of the review comments presented below deal with the Regime group recommendations.

Do the environmental flow analyses conducted by the BBEST appear to be based on a consideration of all reasonably available science, without regard to the need for water for other uses?

The BBEST had the results of contract work relative to ecological overlays for both the San Jacinto and Trinity basins. However, the information gathered during those efforts does not appear to be used in the report to any extent by the Conditional group and only in a limited fashion by the Regime group. There was some water quality work incorporated but little to no sediment transport overlay discussed by either group. Additionally, the Conditional group did not consider work conducted outside the basin to be applicable.

The SAC does not believe the Conditional group considered "all reasonably available science". In fact, much of the Conditional group's recommendation stems from their

opinion that the available science is wholly insufficient to allow defensible environmental flow analyses.

The SAC does believe the Regime group did a better job of considering reasonably available science, although documentation of the utilization of the ecological information collected by the contractors was limited. Given their finding that the system is currently in a sound ecological state, the dependence largely on historical hydrological analysis is an acceptable starting point for regime analyses.

Are the environmental flow analyses conducted by the BBEST grounded in a scientifically derived process for predicting ecosystem response to changes in instream flows or freshwater inflows?

The Conditional group did not conduct an environmental flow analysis grounded in a scientifically derived process. They did not conduct an environmental flow analysis because their primary concern was that the science was essentially insufficient, that there were no established site-specific quantitative relationships between flow and ecosystem response, and therefore the science was too uncertain to legitimately support derivation of a full flow regime at a various geographic locations within the basin. This position, particularly with respect to the perceived need for site-specific data, largely dictated the limited and "conditional" nature of their recommendations. The SAC believes that the Conditional group set the bar too high on what constitutes a scientifically-sound approach to making flow regime recommendations in the context of the SB 3 process.

The fundamental premise of the SB 3 process is to assemble all "reasonably available science" and make environmental flow regime recommendations based solely on the best available science. Accepting the reality that the Texas river and bay systems are complex, and much can and will be learned from future studies, there is a long history of studies and data collection that can provide insight for science-based environmental flow recommendations. It is also reasonable to employ the professional judgment of researchers and engineering/environmental practitioners such as those appointed to the BBEST. The SAC does not agree that there must be site-specific species/flow relationship data in order to develop an SB 3 flow regime recommendation. Finally, the statute provides a robust adaptive management process through which additional information can be employed to make future modifications to adopted standards.

The Regime group applied the guidance provided by the SAC in using a hydrology-based *default* analysis with overlay of biological and other factors in their instream recommendations. The SAC acknowledges the limitations in depending heavily on historical hydrology, but in the case where the physical system has been deemed to represent a sound ecological environment, using a hydrology-based regime as the starting point is appropriate. In their attempt to establish bay freshwater inflow recommendations, the Regime group also applied a science-driven process using a salinity zonation/focal species approach.

Do the environmental flow regime recommendations appear to be based solely on the best available science?

Given their position that the science is insufficient, the Conditional group chose not to solely employ best available science in their instream recommendations. Also, the Galveston Bay Freshwater Inflow Group (GBFIG) annual bay inflow targets, seemingly endorsed at the last minute by the Conditional group as their recommendations for Galveston Bay, are based on both science and stakeholder negotiation, hence not based solely on science. (Note that this freshwater inflow "recommendation" is presented solely in the Comments Section of the BBEST report)

The Regime group recommendations appear to be based solely on best available science, and do not appear to incorporate other water supply/demand issues which, under SB 3, are the province of the Stakeholder Committee.

Do the environmental flow regime recommendations reasonably represent a schedule of flow quantities reflecting seasonal and yearly fluctuations that typically vary geographically, by specific location in the watershed?

It is disconcerting that the Conditional group made instream recommendations given their strong position on the uncertainty of the science. The SAC's opinion is that their limited instream recommendations do not constitute a comprehensive regime as suggested by SAC guidance. The bay recommendation based on GBFIG also does not meet the SB 3 definition of flow regime.

The Regime group follows the protocols laid out in the guidance documents provided by the SAC over the last year. Many assumptions underlie the various analytical approaches endorsed by the SAC in the guidance documents. Recognizing the assumptions and limitations inherit in the approaches suggested by the SAC, we are of the opinion that they can be utilized to determine an environmental flow regime as defined in the statute. In all respects - quantities, seasonality and geographic scope – the reported Regime group instream recommendations constitute a regime. The Regime group's freshwater inflow recommendations are seasonally and geographically inclusive but do not consider a schedule of flow quantities to provide all relevant elements of a freshwater inflow regime. Specifically, the recommendations do not embody a comprehensive range of inflow conditions (e.g. higher flows and inflow minimums) that are necessary to maintain other components of the ecosystem or other aspects of the biology of the indicator organisms selected. Therefore, the SAC feels the inflow recommendations provide only a good starting point for evaluating inflows required to provide suitable conditions for certain indicator organisms.

Did the BBEST establish that the environmental flow recommendations are adequate to support a sound ecological environment and to maintain the productivity, extent and persistence of key aquatic habitats in and along the affected water bodies?

The SAC's opinion is that the Conditional group did not adequately develop a protective regime for either the instream flow or freshwater inflow into the bay.

The SAC's opinion is that the Regime group's instream recommendation did meet all the required SB 3 directives including having attainment frequencies associated with the recommendations. Also, the Regime group used a science driven process and incorporated all reasonably available science to establish freshwater inflow recommendations. The recommendations were based solely on science without consideration for other water uses. However, with respect to the Galveston Bay freshwater inflow recommendations, although the indicator approach was a good starting point for determining one component of a flow regime, it was based only on a few indicators without a sufficient documentation of how the proposed flow component would affect other bay organisms. Additionally, the proposed freshwater inflow recommendations did not embody the full spectrum of flow components considered necessary to constitute a protective flow regime. (It should be noted that the BBEST members presenting the Regime results to the SAC in January indicated that the results had been evaluated for the other indicator species; however, this effort is not documented in the final report.)