



October 24, 2008

South Central Texas Regional Water Planning Group (Region L)  
c/o Sam Vaughn  
HDR Engineering  
4401 West Gate Blvd., Ste 400  
Austin, Texas 78745-1469

Re: Comments on Draft Technical Study 4 for 2011 Regional Water Plan

Mr. Vaughn and Region L members:

The Lone Star Chapter of the Sierra Club and National Wildlife Federation appreciate the opportunity to provide written comments on the Region L Draft Technical Study for the 2011 Regional Water Plan: *Study 4 Part A Environmental Studies*.

As evidenced by the passage of Senate Bill 3 in the last Texas legislative session, maintaining and providing sufficient instream flows along or rivers has become a priority for the state's water resources planning and management efforts. Thus, we applaud the South Central Texas Regional Water Planning Group (SCTRWPG) for its efforts to address this important public policy issue. To date, we know of no other Regional Water Planning Group which has focused on this issue to the extent that you have.

We do however have some substantial feedback on these efforts which we hope will allow you to improve the Regional Water Plan. As you know, the underlying goal of environmental studies taken on by the SCTRWPG is to meet the statutory requirement that "strategies shall be selected so that cost effective water management strategies which are consistent with long-term protection of the state's water resources, agricultural resources, and natural resources are adopted." [31 TAC § 357.7 (a)(9)]. We feel that the Group is making a serious effort in this regard but we still have some strong reservations about whether that goal has been achieved.

Our comments are mostly page- or section-specific. Your consideration of this input will be appreciated.

We offer the following specific comments:

## **Executive Summary**

Table ES-1: an additional table showing the changes from the original amount would be helpful.

Page ES-4, 1<sup>st</sup> Paragraph:

The first two sentences of this paragraph contain too much jargon for the general public to understand.

ES-5. Low Flow Criteria

The first sentence is oversimplified. Instream flows and the referenced study evaluate many other components in addition to DO. In addition, there should be some identification for the permit number presented.

ES-5. Base Flow Criteria

The first sentence should be referenced.

ES-6. Discussion of Ecologically-Based Streamflow Assessments

The first sentence needs clarification to note that this is in reference to surface-water projects in the Plan. Groundwater projects in the plan may have impacts on surface water.

## **Section 2.0 Guadalupe Estuary Harvest Equations**

Page 2, 1<sup>st</sup> Paragraph:

A 1994 study is the most comprehensive summary to date?

Page 2, last paragraph:

A diagram or additional discussion of why there is an overestimate would be helpful at this point. Move figure 2-2 to this section. However, this schematic needs better labeling.

### **Section 2.1.1 Diversion Data**

Page 3, Section 2.1.1

We find this section, starting with the last paragraph on page 3, difficult to follow.

Page 4, Second complete paragraph.

The amount of discrepancy between total diversions and consumptive use should be in this discussion here and as they pertain to the statement in the 4<sup>th</sup> paragraph: ... "as *Invista* return flows were accounted for as net consumptive use..."

### **Section 2.1.2 Return Flow Data**

Page 5, first section.

There are some significant discrepancies between these two data sets regarding 1977-79 and 1988 and require more discussion than simply "USGS flow records...tend to support the higher net diversion figure...". The fact that the updated equations consistently over-estimate inflow also suggest some potential bias.

## **Section 2.4 Harvest Equations with Updated historical Freshwater Inflow Estimates**

Page 10, 2<sup>nd</sup> paragraph.

"*The average annual harvests calculated using the updated equations more closely [sic] the average reported harvests than do the average harvest values calculated using the original equations for six of the seven species of interest*" This is not readily apparent from the graphs, and even if this is true, the improvement is quite minimal.

## **Section 2.6 Conclusions and Recommendations**

Page 14

... "the updated harvest equations do improve the robustness of the equations by broadening the flow bounds within which the equations are applicable." Perhaps this is a true statement, but it appears that this broadening of flow bounds results from the inclusion of 1963 data. It should be noted, that for 1963, the original model predicts harvest better than the updated equation.

Page 14, 2<sup>nd</sup> paragraph.

As there is no mention related to MinQ and MaxH in discussion, it does not seem appropriate to introduce it in the conclusions.

## **Section 3.0 Ecologically-Based Streamflow Assessments**

The techniques employed within this section are generally well founded; the Group and its consultants endeavor to assess streamflow adequacy with a number of criteria across a spectrum of flow magnitudes. At a general level this is very appropriate and very much attuned to current approaches outlined in the Texas Instream Flows program created by S.B. 2<sup>1</sup> and indeed in line with techniques used in much of the nation<sup>2</sup>.

---

<sup>1</sup> Texas Commission on Environmental Quality (TCEQ), Texas Parks and Wildlife Department (TPWD), & Texas Water Development Board (TWDB), "Texas Instream Flow Studies: Technical Overview," TWDB Report 369, May 2008.

<sup>2</sup> Poff, N.L. and J.D. Allan. 1997. *The Natural Flow Regime*. Bioscience 47(11):769-785.

Thus, this is a highly commendable effort on the part of the SCTRWPG. However there are some shortcomings that we will address with specific comments below. At the “big picture” level we are very surprised by the lack of change between the “Present Conditions” and “Regional Water Plan” scenarios, especially on the Guadalupe River. We acknowledge that no major projects that would greatly alter streamflow magnitudes and patterns, e.g. mainstem reservoir projects or very large wastewater reuse initiatives, are proposed in the regional water plan. Furthermore, groundwater withdrawal in the Edwards Aquifer is closely controlled presently and in the “with plan” scenario. However, we do feel that some of the apparent lack of impact of the regional water plan is due to an incorrect specification of the “Present Conditions” scenario. More on this below.

### **Section 3.1 Streamflow Criteria**

We would like to make a few global comments here about the techniques used to derive the instream flow criteria used as benchmarks for assessing the Regional Water Plan. While we understand that time and budget limitations are always bearing upon the efforts of the SCTRWPG, frankly, the techniques for deriving several of the instream flow benchmark criteria of these analyses are fairly lacking in rigor. Several specific issues are apparent:

- First, the chosen criteria are a mixture of monthly and daily values. The low-flow criteria and apparently the high-flow benchmarks are based on daily values. However, the all-important base flow criteria, essentially a “normal” flow expectation, is based on several existing studies that all apparently used monthly flow values. It is almost universally accepted that daily values should be employed for derivation of instream flow benchmark criteria.<sup>3</sup>
- Secondly, with the exception of the derived high-flow criteria, the chosen criteria are a mixture of values from existing studies. This leads to several problems which could have been avoided with an original effort to derive a set of criteria from raw streamflow data. For instance the base flow criteria were selected from existing studies. The result is that the chosen criteria, especially for the Guadalupe site, end up with individual monthly values far below the 25<sup>th</sup> percentile monthly flows. This seems like an unreasonable benchmark for “normal” flows. Since the source for the final values is an unpublished report it is not possible to ascertain what the instream habitat maintenance goals of these criteria were, but the criteria are so low that it appears that they may not support the functions of base-flows as outlined in cited Texas Instream Flow program documents. Perhaps these values are derived with daily data which does not compare well with other monthly values, but on the face of it these appear to be much too low.
- Thirdly, again owing to the use of existing criteria rather than an original effort by the SCTRWPG and its consultant, the criteria are plagued with some serious overlap problems. For instance there is only 22% difference in the magnitude of the low and

---

<sup>3</sup> Richter, B. D., J. V. Baumgartner, J. Powell, and D. P. Braun. 1996. A method for assessing hydrologic alteration within ecosystems. *Conservation Biology* 10:1163-1174.

base criteria on the Guadalupe site in August. The base flow criteria for Oct. at the San Antonio River site is lower than the low-flow value and they are equal in Nov. The August base-flow value at the San Antonio River site for Aug. is only 8% above the low-flow value.

### **Section 3.1.1 High Flow Criteria**

This section starts out by discussing two distinct types of criteria in the upper end of the flow range: high-flow pulses and overbanking flows. However there is a quick move to just the overbanking flow as the sole criteria of evaluation although these two types of flows play distinct roles as outlined in the cited literature from the Texas Instream Flows program<sup>4</sup>. If only one criteria is used, some justification for this should be presented (too close together, inadequate data to derive, ...).

It is unclear if the derivation of the high-flow values are based on daily average, or instantaneous data. Is the technique consistent with the later utilization of daily average flows derived from the WAM output as described.

For derivation of instream flow criteria based on gauge records it is desirable to use just the portion that could be characterized as “pre-development” if possible<sup>5</sup>. Because of the likely large influence of Canyon Dam on the streamflow statistics, there should at least be some effort devoted to analyzing pre- and post- Canyon portions of the flow record separately to judge the sensitivity of the chosen criteria.

It should also be mentioned that the 2-year return period level of flow is essentially a “placeholder” criteria and that more specific evaluations will be made to see what level of flow produces the desired channel and floodplain functions of these high-flow events.

### **Section 3.1.2 Low Flow Criteria**

This section ends with a very obscure and undocumented exercise leading to the selection of the low-flow criteria for the San Antonio River site. Although “sustainable aquatic habitat” is cited, no support is given for the chosen flow value of 76cfs. Some of the items mentioned, in fact, amount to an override of instream flows science with public policy considerations (whether official or not is unclear). For instance the cited “protection of downstream water rights” is an important public policy no doubt, but is not a scientific basis in and of itself to support a low-flow criteria that is intended for instream flow biologic functions. Furthermore, if such water right protection is codified in some policy document, such as a water right special condition or wastewater

---

<sup>4</sup> TCEQ, TPWD, & TWDB, “Texas Instream Flow Studies: Technical Overview,” TWDB Report 369, May 2008, see page 104-7.

<sup>5</sup> Ibid, page 52 and Richter, B. D., R. Mathews, D. L. Harrison, and R. Wigington. 2003. *Ecologically Sustainable Water Management: Managing River Flows for Ecological Integrity*. Ecological Applications, Vol 13, pgs. 206-224.

discharge minimum, it should be reflected in the Guadalupe-San Antonio WAM. In this case the choice of this as a low-flow criteria is clearly a ill-considered crossover between what should be distinct exercises of first, developing a criteria and then second, running the WAM to assess streamflow adequacy against the criteria.

### **Section 3.1.3 Base Flow Criteria**

It is unclear what “translated downstream” means here. A graphic showing the ‘noticeable similarities between potential base streamflow criteria’ between Gonzales and Victoria should be included.

We note that monthly flow data during a period of low-flow (Aug-Sep 2000) show the flow at Victoria to be more than 45 cfs greater than at Gonzales.

As pointed out above, the chosen criteria, especially for the Guadalupe site, appear to be unreasonably low to represent “normal” flows. with individual monthly values far below the 25<sup>th</sup> percentile monthly flows.

To avoid confusion, Figures 3.2-3.4 should be included closer to the text in which they are referenced rather than the following section.

## **Section 3.2 Simulation Descriptions**

We do feel it is appropriate to utilize estimates of daily flows for these evaluations, consistent with the time-scale recommendations of the Texas Instream Flows program<sup>6</sup>. However, distributing natural flows, even the partially naturalized values used here, is problematic if using gauge records from the post-development period which should show a major peak-attenuation effect from Canyon dam and others. The text only says that “representative daily patterns” were used. More elaboration of the technique employed is needed. This distribution problem for naturalized flows may in fact be contributing to the lack of variation in the results for high flows (Section 3.3). One possible approach would be to distribute high natural flows in the later portion of the record, with gauge records from the earlier less-developed period, at least before Canyon Dam. We believe much more attention to naturalized flow magnitudes and peak discharge is warranted in this study.

Also, the net result of this particular study, for the base flow case, is a comparison of daily flow values to benchmark flows that were apparently derived with monthly statistics. This is of course, not a fatal flaw in the analyses, since all four scenarios use the same benchmarks in a comparative fashion. However, we believe it would be better to strive for benchmarks themselves that are based on daily flow values (see above comments on Streamflow Criteria).

---

<sup>6</sup> TCEQ, TPWD, & TWDB, “Texas Instream Flow Studies: Technical Overview,” TWDB Report 369, May 2008.

### **Section 3.2.1 Natural Conditions**

This section explains that the analyses are based on only the “partially naturalized” flows of the Guadalupe-San Antonio WAM: naturalized flows that did not remove the major effects of human groundwater pumping from the Edwards Aquifer. From a fundamental instream flow science point of view this is a major shortcoming of these analyses. It also appears to be unnecessary. The SCTRWPG, in a special section of their previous regional plan (Section 7.1.3 *Supplemental Evaluations of Potential Long-Term Changes in Freshwater Inflows to the Guadalupe Estuary*), employed estimates of “fully naturalized” flows derived with no pumping from the Edwards Aquifer. Although these flows were only estimates, as is everything else in the WAM, there was apparent agreement by the SCTRWPG and their consultant that these estimates were better than not addressing the deficiency of the default WAM values at all. In the previous regional plan the Group was willing to utilize a set of better naturalized flow estimates, with appropriate labeling and description of their derivation technique. Thus, this new work is both somewhat incomplete in rigor and inconsistent with previous environmental evaluations completed by the SCTRWPG.

### **Section 3.2.2 Present Conditions**

We have several concerns for this section:

- First, the initial paragraph of this section explains that the “present conditions” reflect likely usage in a near-term (2-5 year) severe drought. We have serious reservations though on the level of use set for the water rights associated with Canyon Lake. The text on page 22 states that these are modeled at a level of 65,000 ac-ft/yr. While there may be contracts for this amount, we seriously doubt that this use level could be exercised in the 2-5 year time frame. Reinforcing this view, the most recent (2005) Guadalupe-San Antonio WAM Run8 data available from TCEQ has the water use level for the original Canyon water right (18-2074) set to just over 14,000 ac-ft/yr. Run 8 values are supposed to reflect the highest use over the last 10 year period. Thus the use level of the water right may be on the order of 30,000-50,000 ac-ft/yr too high.

We would also opine that 2006 and 2008 were very severe drought years and that some strong inferences on likely use near-term use levels could be obtained through focusing on these real world data.

- Second, while it is arguable as to whether the surface water withdrawal values utilized accurately reflect the “present”, we are also concerned about the chosen level of wastewater discharge from a single year 1997 may not. Typically, Run 8 of the WAM uses a low return flow estimate to be conservative about expected streamflow conditions, but we believe that 1997 was an unusually cool and wetter than normal year, especially in the summer months. This may have unduly influenced the wastewater discharge profile of that year such that it is not what can be expected in a drought.

- Third, a point of concern that is broader than this study alone, is the use of constant inflows (CI records) in the Guadalupe-San Antonio WAM to represent all return flows at fixed values. The result of this is that there is no difference in return flows between wet and dry years. While we acknowledge that groundwater-based return flows are more stable than surface water derived values, we do think some effort should be made to assess the sensitivity of the results of this section to the assumed constancy of discharges.
- Fourth, are the detailed assumptions for water right use and return flows listed consistent with the previous efforts to assess the effects of the regional water plan? If not, then some brief mention of major changed circumstances would help the reader.
- Fifth - It is unclear why the 2006 Critical Period Rules were used here rather than the updated rules.

#### **Section 3.2.4 Regional Water Plan**

We applaud the discussion of groundwater projects impact to streams. Some additional discussion of these impacts and how they were derived would be helpful.

### **Section 3.3 Results of the Ecologically-Based Streamflow Assessments**

As we stated earlier, the inclusion of this assessment is a great step forward for the SCTRWPG, but we have some reservations about the veracity of the results and, by extension, the implications for the regional water plan. Our overriding concern is that much potential impact of the regional water plan is “cloaked” because of the manner in which the “Present Conditions” scenario is constructed. As discussed above, the level of use from the Canyon Reservoir appears to be on the order of 30,000-50,000 ac-ft/yr too high. Thus we believe that many of the apparent small changes, either in base flow attainment, or consecutive days below the low-flow benchmark, are not well-supported. At a minimum, we believe the SCTRWPG should perform a sensitivity analysis to ascertain the influence of this water use level assumption.

In addition to that very serious concern with the “Present Conditions” scenario specification, we would like to point out a few shortcomings in the particular instream flow analyses of this section. Several of these are potentially easy to address.

- Probably the most noticeable thing missing here is any assessment of seasonal effects of the flow changes of the various scenarios. Most instream flow evaluations try to consider flow aspects related to magnitude, frequency, duration, and timing of key flow events<sup>7</sup>. For instance, in the assessment of base flows, the time of year of occurrence is important. If all of the occurrences of not meeting the base flow are clumped in a

---

<sup>7</sup> Poff, N. L., J. D. Allen, B. Bain, J. R. Karr, K. L. Prestegard, B. D. Richter, R. E. Sparks, and J. C. Stromberg. 1997. The natural flow regime: a paradigm for river conservation and restoration. *BioScience* 47:769-784.

certain season or in the same season for several consecutive years, then this may be a serious problem that is masked by treating the entire period of record equally.

- In addition to the seasonal aspects, there should be more of an attempt to look at durational aspects of base flow. Duration of non-attainment is addressed for low-flows.

For clarity to the public reader, it should be explained why the simulation period stops at 1989 though much of the discussion in the text is about water rights diversions and return flows up through 2003.

### **Section 3.3.1 Results for Guadalupe River at Victoria**

The apparent lack of variation in the high-flow assessment may be simply due to the technique used to derive the criteria in the first place. As pointed out above, this criteria should be based on a pre-development period of hydrology. It is not documented as to what period of record was used to derive the 2-year reoccurrence interval flow developed here as the benchmark. As mentioned above, distributing natural flows, even the partially naturalized values used here, is problematic if using gauge records after significant watershed changes have occurred.

As noted above, seasonal aspects are important and are missing in the low-flow results.

### **Section 3.4 Discussion of the Ecologically-Based Streamflow Assessments**

The Guadalupe River discussion should point out that the projected lack of change is across the Present to Plan scenarios and should be extended only with great caution to the natural scenario due to the deficiencies of those flows (discussed above).

The discussion of low-flow results for the San Antonio River site should also include some discussion of the potential detrimental effects of not having low flows<sup>8</sup>.

We agree that the ongoing studies by TPWD and others will yield more information on assessment criteria and techniques.

### **Grammatical feedback**

- Page 15 – National Wildlife Federation
- Page 16 – would be clearer if “flow consistent with a 2-year return period” was just “equal to a 2-year return period.”
- Page 18, 19 – first sentence on page 18 is grammatically awkward comparing physical items (basins), individuals, and agencies. Similar for last sentence on page 19.

---

<sup>8</sup> TCEQ, TPWD, & TWDB, “Texas Instream Flow Studies: Technical Overview,” TWDB Report 369, May 2008, see page 52.

- Page 19 – first sentence under Fig. 3-2 is grammatically ill-advised with “are plotted” clause dangling on the end.
- Page 21 – for clarity, the 2<sup>nd</sup> sentence should probably state that “these natural flows, in the Guadalupe-San Antonio WAM, reflect historical pumpage ...”
- Page 21 – the two uses of the words “simulated historical” appear to be erroneous. We believe the writer intended to say “simulated natural” springflows needed to get fully naturalized surface water flows.
- Page 22 – replace “Canyon” with “GBRA.”

Again we appreciate the opportunity to offer this input to the South Central Texas Water Planning Group and look forward to continued dialogue on this important work. Please feel free to contact us with any questions.

Sincerely,

Tyson Broad  
Research Associate  
Sierra Club  
PO Box 1931  
Austin, TX 78767

Norman D. Johns, PhD  
Water Resources Scientist  
National Wildlife Federation  
44 East Ave, #200  
Austin, TX 78701