



January 15, 2013

*Delivered via Email*

Dr. Robert Gulley  
Executive Director, Habitat Conservation Plan  
Edwards Aquifer Authority  
1615 N. St. Mary's Street  
San Antonio, Texas 78215

Re: SAWS Review of Technical Memorandum - Recommendations for Development of Ecological Modeling Work Plan

Dear Dr. Gulley:

The Edwards Aquifer Habitat Conservation Plan (EAHCP) Implementing Committee engaged the services of a team of local experts to begin to address the expert panel's recommendation by drawing on their familiarity with the Edwards springs-species and unique ecologies to apply that knowledge to "Recommendation #1" which is outlined in draft technical memorandum, dated December 15, 2012. That team of local experts, Mr. Oborny and Dr. Hardy, presented their draft recommendations to the EAHCP Science Committee members and participating stakeholders at the Science Committee's November meeting.

On December 5, 2012, San Antonio Water System (SAWS) offered comments on the draft technical memorandum. Some of our observations and concerns were addressed in the final technical memorandum, but SAWS staff have shared with our Implementing Committee representative a number of our lingering policy and technical concerns with the approach outlined in the technical memorandum.

SAWS staffs' concerns with the approach recommended by the technical memorandum from the technical perspective are:

- "Threats posed by [*vegetation disturbance associated with recreation*] and other sources at low flows may be as great as or greater than the availability of weighted usable area and physical habitat in which organisms may live."<sup>1</sup>
- "Other measures to control secondary impacts such as those associated with recreation are equally or more important elements in a recovery program."<sup>2</sup>

---

<sup>1</sup>Annear Associates, LLC et al. 2011. "Professional Peer Review of: Evaluation of the Proposed Edwards Aquifer Recovery Implementation Program Drought of Record Minimum Flow Regimes in the Comal and San Marcos River Systems: Final Hardy Report to the Edwards Aquifer Recovery Implementation Program." pg. 3

<sup>2</sup>*Id.* at pp. 15-16

Dr. Robert Gulley  
 January 15, 2013  
 Page 2

- In some years, increased mechanical impacts and physical disturbances "caused the greatest impact."<sup>3</sup>
- Submerged aquatic vegetation can "flourish, even as flows decrease," absent physical disturbances and mechanical impacts.<sup>4</sup>
- In instances where quantitative data<sup>3,5</sup> for the degree of physical impact or mechanical disturbances is lacking, a rating scale of 1-10 has been developed to rank the degree of impact and was implemented for the past two years.<sup>6,7</sup>
  - o This could be an important tool in the proposal that follows.
- In 2010, submerged aquatic vegetation was recovering in the Sewell Park reach of the San Marcos River. This was not due to some physiological response of the vegetation to the higher springflows. The recovery of the submerged aquatic vegetation was attributed to the mitigation such flows provided for relief from mechanical impacts and physical disturbances.<sup>8</sup>

These observations concern SAWS staff from the technical perspective because:

- The purpose of the ecological models is to evaluate the ecological and physiological responses of submerged aquatic vegetation to springflow levels that haven't been

<sup>3</sup>BIO-WEST, Inc. 2007. "*Variable Flow Study: Seven Years of Monitoring & Applied Research.*" For Edwards Aquifer Authority. pp. v-vi, 14, 19, 28 (234 m<sup>2</sup> physically removed by recreationalists), 32-33, 37, 39, 49, 53 (noting "increased recreational activity during 2006 caused the greatest impacts"), 57-58, 61, and Figures 5.9 & 5.10.

<sup>4</sup>BIO-WEST, Inc. 2010. "*Comprehensive and Critical Period Monitoring Program to Evaluate the Effects of Variable Flow on Biological Resources in the San Marcos Springs/River Aquatic Ecosystem Final 2010 Annual Report.*" For Edwards Aquifer Authority. March 2011. p. 19

<sup>5</sup>BIO-WEST, Inc. 2009. "*Comprehensive and Critical Period Monitoring Program to Evaluate the Effects of Variable Flow on Biological Resources in the San Marcos Springs/River Aquatic Ecosystem Final 2009 Annual Report.*" For Edwards Aquifer Authority. March 2010. p.1-3, 10, 26 (noting over 1,000 m<sup>2</sup> of recreation impact to submerged aquatic vegetation), 30-33 (noting a 14% decrease in Texas Wild-rice), 40, 43, & 48.

<sup>6</sup>BIO-WEST, Inc. 2010. "*Comprehensive and Critical Period Monitoring Program to Evaluate the Effects of Variable Flow on Biological Resources in the San Marcos Springs/River Aquatic Ecosystem Final 2010 Annual Report.*" For Edwards Aquifer Authority. March 2011. p. 13

<sup>7</sup>BIO-WEST, Inc. 2011. "*Comprehensive and Critical Period Monitoring Program to Evaluate the Effects of Variable Flow on Biological Resources in the San Marcos Springs/River Aquatic Ecosystem Final 2011 Annual Report.*" For Edwards Aquifer Authority. March 2012. p. 16

<sup>8</sup>BIO-WEST, Inc. 2010. "*Comprehensive and Critical Period Monitoring Program to Evaluate the Effects of Variable Flow on Biological Resources in the San Marcos Springs/River Aquatic Ecosystem Final 2010 Annual Report.*" For Edwards Aquifer Authority. March 2011. p. 27

Dr. Robert Gulley  
January 15, 2013  
Page 3

observed during the time frame when the spring ecosystems were being intensively monitored.

- The ecological and physiological responses of the submerged aquatic vegetation could be improperly calibrated in this application to respond, in a modeled sense, to the physical disturbances and mechanical impacts that occurred at just slightly below average flows.
- When these United States Army Corps of Engineers (USACE) models are then utilized to evaluate each spring ecosystem's ecological response to Drought of Record level flows contemplated in the EAHCP, the aquatic vegetation may respond in a more adverse manner in the model than it would in reality, due to the physical disturbances and other mechanical impacts (damage) that was incurred prior to the vegetation surveys that were used to calibrate the models, but were not accounted for in that calibration.
- The vegetation surveys which are planned to be used (five system-wide, approximately 30 for the seven representative reaches) already reflect physical disturbances from recreation. The result may be that recreation damage in the USACE aquatic vegetation models will be improperly attributed to either flow levels (velocity), temperature, substrate type, or some other water quality parameter.

SAWS staff would like to propose the following:

- The next step of the ecological model development process requires the development of a scope of work and the necessary procurement documents. A dual calibration approach to the calibration of the USACE aquatic vegetation models could be appended to the scope to begin the process to validate, calibrate, and apply the ecological models to the Comal and San Marcos Springs systems. In this dual calibration approach, the USACE aquatic vegetation models are calibrated as proposed by the authors of this technical memorandum. However, in addition, the aquatic vegetation surveys are "restored" to remove the effects of physical disturbances and mechanical impacts. For example, if a stand of *Vallisneria* in the survey is fragmented by waders, the stand would be "restored" and the recreation impact would be removed from the survey. Once this was conducted for all of the surveys, or a subset of the surveys, the submerged aquatic vegetation models from the USACE would use the "restored" surveys for an alternative calibration, and the outputs in terms of vegetative cover, biomass, species characteristic values, and equations describing the aquatic plants' ecological and physiological response to velocity could be compared to determine whether there is any significant difference.

We understand that such "restoration" of the vegetation surveys prior to the alternative calibration may be laborious and does present numerous opportunities for debatable professional judgments or unintentional errors to enter the process, as well as poses questions as to just how much of the changes in the ecology's health is attributable to the aquatic vegetation's reaction to springflow volume versus the physical disturbance and mechanical impacts noted above (the rating scale of 1-10 may be helpful in partially addressing these questions however). Therefore,

Dr. Robert Gulley  
January 15, 2013  
Page 4

this survey "restoration" should be conducted transparently and by a convocation of local expert scientists and stakeholders who are very familiar with the spring systems, the on the ground history and typical usage patterns of the habitats, and the physical disturbances that have been noted.


The possibility that this dual calibration approach may require a budget amendment, or a reallocation of funding among the proposed ecological questions for 2013, should also be investigated.


SAWS staff would like to make you aware that we have recommended to our Implementing Committee representatives not to proceed on the path recommended in the Technical Memorandum absent explicit acknowledgement of, and some way of incorporating the impacts of, water-based contact recreation in the critical habitats and the impacts of that activity on the submerged aquatic vegetation in the developing ecological models.

We would appreciate if this matter could be discussed among the other Implementing Committee members, the authors of the technical memorandum, and perhaps the Science Committee before any further Implementing Committee action is undertaken on this recommendation for the 2013 ecological models work plan.

Thank you for the opportunities to review and comment on the technical memorandum, to share our thoughts, and to propose a possible resolution.

Sincerely,

  
Steven Bereyso  
Planner – Edwards Activities  
Water Resources

  
Patrick Shriver  
Project Coordinator – Edwards Activities  
Water Resources

cc:

Charles Ahrens, Vice President, Water Resources & Conservation  
Darren Thompson, Director, Water Resources