Request for Statement of Interest and Qualifications
Groundwater Modeling Services
Submit no later than 12:00 p.m. Noon CDT, December 20, 2024

The Barton Springs/Edwards Aquifer Conservation District (District) is soliciting statements of interest and qualifications for assisting the District with completing components of Phase II of the District's Trinity Aquifer Sustainability Model (TAS). TAS is a numerical model created in MODFLOW to simulate water levels, groundwater flow, springflow, and storage in the Middle Trinity Aquifer in Hays County. A workplan for TAS Phase II is included as Appendix A of this RFQ. The intent of this solicitation is to enter a master services agreement/contract for either a particular task at a certain price or on-demand services where work will be performed per a task order that will be compensated on a time-and-materials basis. Each task order will define a "not to exceed" cost of for that task order service. In addition to reviewing Appendix A of this RFQ, interested parties are encouraged to review the TAS Phase I model report, available at the following District website link: <https://bseacd.org/2023/07/trinity-aquifer-sustainability-model/>

Interested parties are asked to submit a brief statement of interest, qualifications, and experience (SOQs), not to exceed ten pages, to the District by 5 p.m. December 20, 2024. The SOQs should include a description of relevant project-based experience conducted by the offeror; specification of the individual(s) who will most likely be performing the work and a paragraph summary for each that summarizes individual qualifications and experience; and any other information that the offeror deems relevant to coordinating this review.

Generally, the District intends to follow the Texas Professional Services Procurement Act and District Purchasing Policy in soliciting, evaluating, and negotiating the services, without regard to whether these particular services are subject to that Act and Policy. On the basis of the information provided by the offerors under this solicitation, the District will evaluate and develop a short list of candidates; conduct interviews as necessary; then issue a request for proposals to the selected short list of candidates. Proposals received will be evaluated and the first-choice proposal candidate will be recommended to the Board for next-step discussions and negotiation of mutually acceptable terms for the proposed task order and/or contract with the best proposal, or if necessary, the next best proposal.

The District will contract with the successful offering individual, group, or company for work to begin no later than March 1, 2025 and be completed no later than August 31, 2025.

The SOQs can be sent to:

Barton Springs/Edwards Aquifer Conservation District
Attn: SOQ Solicitation
1124 Regal Row
Austin, TX 78748

Or digitally to: bseacd@bseacd.org (Subject: Groundwater Modeling Support Services SOQ)

Any questions about this solicitation should be submitted via email to bseacd@bseacd.org. The District in its sole discretion may choose to respond only to the questioning entity or to post such questions and responses to be available to all potential offerors via the District website: Barton Springs/Edwards Aquifer Conservation District (bseacd.org)

Appendix A:

Workplan for Phase II Development the BSEACD Trinity Aquifer Sustainability Model (TAS)

Jeff Watson, P.G.
BSEACD Senior Hydrogeologist

Workplan Overview

Since 2019, the BSEACD has been developing a numerical groundwater model to simulate water levels, groundwater flow, springflow, and storage in the Trinity Aquifer. The primary goal of this model is to provide a tool to help guide stakeholders and policymakers in the District's ongoing Trinity Sustainable Yield Project (TSY), aimed at establishing a policy framework for sustainable management of the Trinity Aquifer into the future.

The Trinity Aquifer Sustainability Model (TAS) has undergone several stages of development since its inception. A steady state version of the model using MODFLOW 2005 was completed in 2020 (Hunt and Smith, 2020) in which the original model boundaries, cell grids, and boundary conditions were established. In July 2023 a transient MODFLOW-USG version of the model was published (Watson and Smith, 2023), which this document will refer to as TAS Phase I. The TAS Phase I was calibrated to a 13-year calibration period from January 2008-December 2020, with monthly time steps, and many changes and adjustments to the steady state version's boundary conditions. The primary outputs of TAS Phase I were Middle Trinity aquifer head (water level), and springflow at Pleasant Valley Spring (PVS) and Jacobs Well Spring (JWS). Several predictive simulations were also produced from TAS Phase I as proof of concept, and to test how the model performed with long-term forecast modeling (50 years).

Since completion of TAS Phase I, BSEACD staff and board members on the Trinity Sustainable Yield sub-committee have been working to develop a set of specific set of policy questions which will eventually be discussed by policymakers and stakeholders in developing TSY policies. TAS Phase II is a new phase of model development aimed at updating TAS to provide quantitative model forecasts to help provide answers to these emerging policy questions. TAS Phase II is planned to unfold in two sub-parts:

TAS Phase IIa: Updates to model architecture to more effectively provide answers for TSY policy questions, and a recalibration of TAS over the 2008-2024 calibration period.

TAS Phase IIb: Development of specific predictive model scenarios on different time horizons (likely 10-50 years) which simulate aquifer conditions into the future under different stressors, such as pumping and/or drought. These predictive model runs will be used to populate a "decision matrix" table, to which stakeholders and policymakers can refer to better understand the modeled impacts to water levels and springflow in the Trinity due to different management decisions (see decision matrix spreadsheet generated by INTERA).

This Workplan specifies the changes planned for TAS Phase IIa. The specific predictive model scenarios to be developed in Phase IIb will be clarified later as TSY policymaking discussions evolve.

TAS Phase IIa Tasks:

The following tasks are proposed for TAS Phase IIa. Tasks are provided in assumed sequence of completion. However, an iterative approach will likely be necessary to ensure the best product. For example, additional model regridding (task 1) may be required after boundary conditions and hydrogeologic parameters have been updated (task 2).

Task 1) Model Grid Update

- Regrid model layer surfaces with updated geologic surfaces.
    - Incorporate pinchouts in Layer 1 and Layer 2 (Lower Glen Rose and Hensel) where appropriate.
- Increase grid resolution in specific areas of interest using appropriate model gridding tools (possibly quadtree, voronesh, or a combination of the two). Areas of refinement include the following:
    - Along the Blanco River and Cypress Creek upgradient of PVS and JWS, and the Park Spring complex.
    - Large pumping centers within HTGCD and BSEACD, such as the Needmore ranch and Onion Creek Country Club (BSEACD), and the DSWSC well field and large PWS wells operated by Aqua Texas and WWSC in the Wimberley area (HTGCD).
- Extend model grid downgradient to encompass all BSEACD District area. TAS Phase I active model cells terminate within district boundaries.
- Transition the model to MODFLOW 6 model code.

Task 2) Update to Boundary Conditions and Hydrogeologic Parameters

a. In TAS Phase I, some cells in the Blanco springshed area were given extremely high K values to facilitate “flashy” springflow behavior in the vicinity of PVS and JWS, which results from fast conduit flow. While this approach allowed better springflow matching at JWS, it came with the cost of poor head matching in the vicinity of the high K cells. Also, these high K values may have led to overestimation of PVS flow during low flow (drought) periods. To address this issue, K values in these cells will be lowered to values more in line with those measured in aquifer tests. If possible, flashy conduit flow will be simulated by increasing resolution and refining the model grid in the vicinity and upstream of PVS and JWS. However, an alternate approach such as incorporating the connected linear network (CLN) package may be required if grid refinement does not accomplish adequate conduit flow simulation. The CLN option is not preferred as the CLN package is currently only supported in MODFLOW USG, and MODFLOW 6 is our preferred code to minimize the complexity of nesting the TAS model within regional TWDB models

b. Exempt pumping will be transitioned to the WEL package in MODFLOW applied to individual model cells instead of using analytic element polygons in Groundwater Vistas.
    i. Some percentage of exempt pumping will be applied to layers 1 and 2 (Lower Glen Rose and Hensel, respectively) instead of all exempt pumping being applied only to model layer 3 (Cow Creek).

c. In TAS Phase I, recharge coefficients (the percentage of rainfall applied to a given model cell as recharge) were varied over the calibration period based on measured flow values in Blanco River. While this produced reasonable recharge coefficients over the calibration period, it is not ideal for model forecasting because Blanco River flow values will not be available for forward-looking models. Thus, in TAS Phase II, recharge coefficients will be varied based on some reasonable environmental proxy other than Blanco River flow, such as antecedent rainfall over a given time and within a specific geographic area. Decoupling the recharge model from Blanco River flow will allow more robust and flexible model forecasting.
d. Refinement of General head boundaries (GHBs) in downgradient portion of model domain.
e. Refinement of horizontal flow boundaries (HFBs) to better simulate barrier faults.

Task 3) Recalibration: In parallel to the above changes, the model will be recalibrated over a 2008-2024 calibration period. This calibration period adds three additional years of data and will ensure that the model can still reasonably match historic heads and springflow values.

References:

Watson, J.A. and Smith, B.A., 2023, The BSEACD Trinity Aquifer Sustainability Model: A Tool for Evaluating Sustainable Yield of the Trinity Aquifer in Hays County, Texas, BSEACD Report of Investigations 2023-0717, August 2023.

Hunt, B.B. and Smith, B.A., 2020, Development of a Steady State Numerical Model, Middle Trinity Aquifer, Central Texas, BSEACD Technical Memo 2020-0930, September 2020. 80p.