

**Monthly Letter Progress Report #3:
May 28, 2016-July 8, 2016
Study of Brackish Aquifers in Texas – Project No. 4 –
Trinity Aquifer
TWDB Contract No. 1600011950**

Submitted to

**Texas Water Development Board
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2.0 Progress on Tasks

This report summarizes activities on project tasks during Fiscal Year Period 9, Subperiod 2, through the end of Fiscal Year 2016, Period 10, encompassing May 28, 2016 – July 8, 2016, and represents the third progress report on this contract.

Task 1: Project Management

- SwRI staff on the project met with Mark Robinson from TWDB to coordinate future activities and management of the project.
- Subcontracts with the two teaming partners, INTERA and the Bureau of Economic Geology, and with the two in-kind teaming partners, Edwards Aquifer Authority and Barton Springs Edwards Aquifer Conservation District, were in the process of being developed during this reporting period.
- The division of labor between SwRI, the subcontractors, and the in-kind contributors was determined, as well as the division of labor within the SwRI team.

Task 2: Data Acquisition and Method Development

Task 2 has been subdivided into 4 subtasks. Progress on the subtasks is as follows:

Subtask 2.1 Acquisition and Initial Analysis of Groundwater Samples

- The SwRI team began performing spatial queries on Brackish Resources Aquifer Characterization System (BRACS)/TWDB databases.
- Team members began to gather data on water quality.
- Analysis of the groundwater data began in this reporting period.
- Spatial queries on the BRACS/TWDB databases continued during this period.
- The SwRI team has begun evaluating other sources of information, such as groundwater conservation districts, oil and gas databases, and water supply wells. The team began work on the project database of water quality data within the project domain.

Subtask 2.2 Acquisition and Initial Analysis of Geophysical Logs

- Geophysical logs acquired from TWDB are being evaluated for quality and coverage. Once the full domain is determined, we will send off all evaluated logs within the domain to be digitized by Well Green Tech Inc. (<http://www.wellgreentech.com/Digitizing.html>).
- The logs acquired from TWDB are being evaluated to determine which need to be digitized.
- We began to develop a database with spatial attributes of all available logs (e.g., BRACS, IHS, BEG) with care to adhere to BRACS format.
- Spatial queries have begun on BRACS/TWDB databases.
- Other sources of information including Groundwater Conservation Districts, Oil and Gas databases, water supply wells, TCEQ Public Supply, and USGS Produced Water databases are being evaluated.

- A project database of water quality data relevant to project domain and preliminary hydrochemical facies analysis for the project domain has been initiated.

Subtask 2.3 Develop Technical Approach for Estimating Total Dissolved Solids from Geophysical Logs

- There has been no progress on this subtask.

Subtask 2.4 Use Geophysical Log Interpretation to Analyze Stratigraphy and Map Fresh, Brackish, and Saline Groundwater

Data sources and methods for interpreting the geophysical logs are under evaluation.

Task 3: Develop a Stratigraphic Framework Model of the Trinity Aquifer and Calculate Brackish Water Volumes

Task 3 has been subdivided into 2 subtasks. Progress on the subtasks is as follows:

Subtask 3.1 Extend Stratigraphy for the Hill Country Trinity

The literature search and assessment of relevant literature continues.

Subtask 3.2 Determine Volumes of Fresh, Brackish, and Saline Groundwater

There has been no progress on this subtask.

Task 4: Delineate Potential Production Areas

There has been no progress on this task.

Task 5: Determine the Amount of Brackish Groundwater that can be Produced without Causing Impact on Lateral and Vertical Fresh Water

There has been no progress on this task.

Task 6: Stakeholder Communication

There has been no progress on this task.

Task 7: Reporting

Task 7 has been subdivided into 2 subtasks. Progress on the subtasks is as follows:

Subtask 7.1 Project Monitoring Procedures

There has been no progress on this subtask.

Subtask 7.2 Project Deliverables

We delivered a progress report for May 2016, as well as the associated invoices, during June.

3.0 Planned Activities for the Next Reporting Period (Fiscal Year 2016, Period 11)

Task 1: Project Management

- Subcontracts for the two in-kind teaming partners as well as the two subcontractors will be finalized in Fiscal Year 2016, Period 11 .

Task 2: Data Acquisition and Method Development

Task 2 has been subdivided into 4 subtasks. Planned activities for the subtasks are as follows:

Subtask 2.1 Acquisition and Initial Analysis of Groundwater Samples

- We will continue to gather data on water quality during the next reporting period. The aerial down-dip extent for the project domain is under evaluation. This evaluation will be ongoing for most of the project.
- Analysis and results of the groundwater data will continue.
- We will continue to evaluate other sources of information, such as groundwater conservation districts, oil and gas databases, and water supply wells.

Subtask 2.2 Acquisition and Initial Analysis of Geophysical Logs

- The geophysical logs acquired from TWDB will continue to be evaluated to determine which need to be digitized. Evaluation of geophysical logs will continue. The logs will be evaluated against the current GAM. This evaluation will be conducted to determine which logs need to be digitized.
- We continue to develop a database with spatial attributes of all available logs (e.g., BRACS, IHS, BEG) with care to adhere to BRACS format.
- Geophysical logs will be sent to Well Green Tech for digitalization.
- Spatial queries will continue on BRACS/TWDB databases.
- Other sources of relevant information including Groundwater Conservation Districts, Oil and Gas databases, water supply wells, Texas Commission on Environmental Quality (TCEQ) Public Supply, and United States Geological Survey (USGS) Produced Water databases will continue to be evaluated.
- A project database of water quality data relevant to project domain and preliminary hydrochemical facies analysis for project domain will continue to be developed using TWDB's groundwater database.
- A license for the Gulf Coast IHS database will be acquired.

Subtask 2.3 Develop Technical Approach for Estimating Total Dissolved Solids from Geophysical Logs

- Preliminary assessment of developing correlations between Total Dissolved Solids (TDS) and geophysical logs will be initiated.
- Assessment of developing correlations between Total Dissolved Solids and geophysical logs will continue.
- Interpretation of logs for stratigraphy will begin as well as estimation of TDS/Salinity from logs. We will utilize water chemistry statistical tools or equivalent sources to correct TDS values for various chemical influences.

Subtask 2.4 Use Geophysical Log Interpretation to Analyze Stratigraphy and Map Fresh, Brackish, and Saline Groundwater

We will use geophysical logs to map and quantify Trinity groundwater resources after evaluating well log quality. For the logs determined to be of good quality, we will digitize the spontaneous potential and resistivity curve(s). Progress on this subtask is expected to continue in the next reporting period.

Task 3: Develop a Stratigraphic Framework Model of the Trinity Aquifer and Calculate Brackish Water Volumes

Task 3 has been subdivided into 2 subtasks. Planned activities for the subtasks are as follows:

Subtask 3.1 Extend Stratigraphy for the Hill Country Trinity

Progress on this task will continue in the next reporting period with the assessment of relevant literature.

Subtask 3.2 Determine Volumes of Fresh, Brackish, and Saline Groundwater

Evaluation of the relationship between electrical resistivity and fluid salinity will begin in the next Fiscal Period. It is recognized that articulating this relationship will be challenging due to the confounding influences of electrically conductive clay zones, but this work will be central to delineating the extent of brackish water in the Trinity Aquifer because geophysical logs will be the primary source of information used in this subtask.

Task 4: Delineate Potential Production Areas

No work is expected to occur in the next reporting period.

Task 5: Determine the Amount of Brackish Groundwater that can be Produced without Causing Impact on Lateral and Vertical Fresh Water

No work is expected to occur in the next reporting period.

Task 6: Stakeholder Communication

No work is expected to occur in the next reporting period.

Task 7: Reporting

Task 7 has been subdivided into 2 subtasks. Planned activities for the subtasks are as follows:

Subtask 7.1 Project Monitoring Procedures

- Project monitoring procedures will be prepared during the next reporting period.

Subtask 7.2 Project Deliverables

The third progress report will be submitted to TWDB during Fiscal Year 2016, Period 11.

4.0 Problems/Issues and Actions Required/Taken

No problems or issues were encountered during this reporting period.