

**Monthly Letter Progress Report #13:  
Period 7, Fiscal Year 2017  
Study of Brackish Aquifers in Texas –  
Project No. 4 –Trinity Aquifer  
TWDB Contract No. 1600011950**

*Submitted to*

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**Monthly Letter Progress Report #13**  
**March 18, 2017-April 14, 2017**  
**Study of Brackish Aquifers in Texas – Project No. 4 –**  
**Trinity Aquifer**  
**TWDB Contract No. 1600011950**

**1.0 Budget and Expenses**

This report summarizes the project status and costs for the billing period from Contract Approval Date (January 6, 2016) through the end of Period 7 of Fiscal Year 2017 (April 14, 2017). The total expenses through this period are \$198,449.96. A breakdown of the budget by task is provided in Table 1. A copy of the progress report has been sent to Texas Water Development Board (TWDB) along with the monthly invoice.

**2.0 Progress on Tasks**

This report summarizes activities on project tasks during Fiscal Year 2017, Period 7 (encompassing March 18, 2017-April 14, 2017) and represents the thirteenth progress report on this contract.

**Task 1: Project Management**

No work was performed on this task during this reporting period.

**Task 2: Data Acquisition and Method Development**

Task 2 has been subdivided into four subtasks. Progress on activities for the subtasks is as follows:

**Subtask 2.1 Acquisition and Initial Analysis of Groundwater Samples**

No work was performed on this subtask during this reporting period.

**Subtask 2.2 Acquisition and Initial Analysis of Geophysical Logs**

Well log curves from an additional 70 wells were digitized. These logs were selected based on the availability of gamma ray, spontaneous potential (SP) and resistivity curves, proximity to wells with chemistry data, and/or usefulness for calculating brackish water volumes. The SP and resistivity logs were interpreted with water chemistry data to provide insights on regional water chemistry for designated water-bearing horizons.

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

Each water-producing well selected for study was evaluated for screened intervals and chemical data. Stratigraphic picks were extracted from each gamma ray log. These logs were matched to wells with chemical analysis data. Aquifer codes from the BRACS database were consolidated into codes representing the stratigraphic framework groups delineated for this project. TDS and sulfate maps were created to aid in water chemistry analyses.

The Draft Methods Report describing the methods employed in the project, most notably those for estimating TDS from geophysical logs, was submitted to the TWDB.

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

Gamma ray logs are being used to help develop the stratigraphic framework model. In addition, resistivity and SP logs are being used for stratigraphic interpretation at wells which do not have gamma logs. In addition, resistivity and SP logs are being utilized for salinity analysis. SP data are mostly limited to sand-dominated units such as the Hosston and Hensell formations, but have been effective for some Cow Creek producing zones.

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

Task 3 has been subdivided into two subtasks. Progress on activities for the subtasks is as follows:

### Subtask 3.1 Extend Stratigraphy for the Hill Country Trinity

The technical literature has been examined for useful and relevant stratigraphic and structural information and data (e.g., cross-sections, fence diagrams, structure contour maps, well header information, stratigraphic horizon picks from wells, and fault maps). Geophysical logs from the BRACS well database including stratigraphic information, specifically stratigraphic horizon picks and lithologic information, have been evaluated, quality controlled, and re-interpreted as needed. Log information from the IHS database has been evaluated and wells which have logs that penetrate the Trinity Aquifer were used for stratigraphic interpretation. The stratigraphic framework is nearing completion.

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

Evaluation of the relationship between electrical resistivity and fluid salinity continued during this period. The determination of TDS from digitized well log curves also continues.

#### **Task 4: Delineate Potential Production Areas**

Team members initiated the delineation of the potential production zones.

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

Team members have developed a method to model groundwater within the Trinity Aquifer using stratigraphic and geochemical data.

#### **Task 6: Stakeholder Communication**

The second stakeholder meeting for this project will be held on May 8<sup>th</sup>, 2017. Team members have begun preparations for the meeting by contributing to the presentation that will be given.

#### **Task 7: Reporting**

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

##### **Subtask 7.1 Project Monitoring Procedures**

The project timeline has been reviewed frequently. The project budget has been monitored on a weekly basis using the SwRI Project Cost System. Project activity for each period is summarized in status reports for review by TWDB.

##### **Subtask 7.2 Project Deliverables**

Progress on this task during this reporting period has included preparing and delivering “Monthly Letter Progress Report #12: Period 6, Fiscal Year 2017.”

The Draft Methods Report has been submitted to TWDB. Team members have continued work toward identifying the potential production zones. Work on the Draft Final Report has been initiated.

### **3.0 Planned Activities for the Next Reporting Period (Fiscal Year 2017, Period 8)**

#### **Task 1: Project Management**

The agreements with the two in-kind teaming partners, EAA and BSEACD, will be submitted to TWDB as soon as they have been finalized.

#### **Task 2: Data Acquisition and Method Development**

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

Subtask 2.1 Acquisition and Initial Analysis of Groundwater Samples

No work on this task is expected to occur over the next reporting period.

Subtask 2.2 Acquisition and Initial Analysis of Geophysical Logs

Geophysical logs will be correlated with chemical-analysis data. Plots of regional chemistry across the study region will be created for each aquifer. The database with spatial attributes of all logs utilized in this study, with care to adhere to BRACS format, will be finalized. The project database of water quality data relevant to the project domain and preliminary hydrochemical facies analysis for the project domain will be finalized using TWDB's groundwater database.

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

Efforts towards developing a method for correlating TDS data and geophysical log attributes will continue. Deep and shallow resistivity curves will be cross-plotted so that the resistivity of the fluid can be estimated. Feedback from the TWDB regarding the method for correlating TDS data and geophysical log attributes will be incorporated into the proposed approach.

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

Shallow and deep resistivity logs and SP logs will be utilized for salinity analysis.

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

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

Subtask 3.1 Extend Stratigraphy for the Hill Country Trinity

No work on this task is expected to occur over the next reporting period.

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

Evaluation of the relationship between electrical resistivity and fluid salinity will continue during the next period.

**Task 4: Delineate Potential Production Areas**

Work on identifying the potential production zones will be completed during the next period.

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

Efforts toward determining the amount of brackish groundwater available for production without causing negative impact on lateral and vertical fresh water will be completed during the next reporting period.

**Task 6: Stakeholder Communication**

Planning for stakeholder meetings will continue.

**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**

The project timeline will continue to be reviewed frequently. The project budget will continue to be monitored on a weekly basis using the SwRI Project Cost System. Project activity will continue to be summarized in status reports for review by TWDB.

**Subtask 7.2 Project Deliverables**

The thirteenth (current) progress report (covering Period 7, FY 2017) will be submitted to TWDB during Fiscal Year 2017, Period 8.

Team members will consider and incorporate feedback regarding the Draft Methods Report from TWDB as appropriate. The potential production zones will be identified and submitted to TWDB. Work on the Draft Final Report will continue.

**4.0 Problems/Issues and Actions Required/Taken**

No problems or issues were encountered during this period.

**Table 1. Project Budget Versus Expenses**

Task	Description	Budget	Invoices		Remaining Budget
			Current	Total	
1	Project Management	\$22,640.00	\$0.00	\$16,872.03	\$5,767.97
2	Data Acquisition and Method Development	\$134,555.00	\$10,678.77	\$105,075.38	\$29,479.62
3	Develop a Stratigraphic Framework Model of the Trinity Aquifer and Calculate Brackish Water Volumes	\$116,878.00	\$220.78	\$63,657.20	\$53,220.80
4	Delineate Potential Production Areas	\$40,001.00	\$1,084.41	\$2,259.39	\$37,741.61
5	Determine the Amount of Brackish Groundwater that can be Produced without Causing Impact on Lateral and Vertical Fresh Water	\$56,740.00	\$1,000.96	\$1,000.96	\$55,739.04
6	Stakeholder Communication	\$35,631.00	\$0.00	\$0.00	\$35,631.00
7	Reporting	\$13,555.00	\$95.75	\$9,585.00	\$3,970.00
<b>Total</b>		\$420,000.00	\$13,080.67	\$198,449.96	\$221,550.04