

Monthly Letter Progress Report #2– May 2016
Study of Brackish Aquifers in Texas – Gulf Coast Aquifer
TWDB Contract No. 1600011947

Submitted to:

Texas Water Development Board
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1.0 Budget and Expenses

This report summarizes the project costs for a billing period from 4/01/2016 to 4/30/2016. The total invoice is \$35,014. The total expenditures to date are \$131,441. A budget breakdown by tasks is provided in Table 1. A copy of the progress report has been sent to TWDB contracts department along with the monthly invoice.

Table 1. Planned and Incurred Expenses by Task Progress by Tasks

TASK	DESCRIPTION	Budget	Invoices			Remaining Budget
			Current	Previous	Total	
1	Project Management	\$22,740	\$0	\$5,764	\$5,764	\$16,976
2	Delineate Fresh, Brackish, and Saline Groundwater	\$196,650	\$21,574	\$73,487	\$95,062	\$101,588
3	Quantify Groundwater Volumes	\$52,430	\$5,746	\$12,084	\$17,830	\$34,600
4	Delineate Brackish Groundwater Zones	\$93,160	\$7,352	\$3,110	\$10,462	\$82,698
5	Stakeholder Communications	\$11,815	\$341	\$0	\$341	\$11,474
6	Determine GW Brackish Groundwater Over 30-year and 50-year Periods	\$92,690	\$0	\$1,981	\$1,981	\$90,709
7	Reporting and Deliverables	\$30,515	\$0	\$0	\$0	\$30,515
Total		\$500,000	\$35,014	\$94,446	\$131,441	\$368,559

Progress on task is reported through May 24th.

Task 1 Project Management

Conducted teleconference with subcontractors.

Set up subcontract with Dr. Jack Sharp.

A draft subcontract was sent to Corolla for their review.

Met with the TWDB Board on May 17 at INTERA offices to discuss status of project. Nathan van Oort, John Meyer, and Rohit Goswami from TWDB attended the meeting.

Set a meeting with the Texas Railroad Commission for June 1 to discuss issues associated with defining and characterizing potential brackish production zones in the Gulf Coast Aquifer.

Obtained permission from IHS to release a limited a limited number of logs to the state as part of the brackish groundwater investigation.

Task 2 Delineate Fresh, Brackish, and Saline Groundwater

Constructed a database of measured TDS concentrations in water wells. Identify which wells have screened information. Identified appropriately 800 locations where a geophysical log is within 1 miles of a water well with measured TDS concentrations an identified screened interval.

Approximately 650 geophysical logs have been digitized. These digitized logs will be used for determining relationships between Ro and TDS and for determining the volume of brackish water in the Gulf Coast. We anticipate that approximately 500 logs will need to be digitized.

We have obtained from the Texas Railroad Commission a data set of elevations used by the Groundwater Advisory Unit to represent the base of Superior and the base of Useable groundwater. These elevations were contoured to create surfaces that were shown to the TWDB on May 17th.

We have used temperature data obtained from Southern Methodist University to map the temperature near the ground surface and at a depth of 3,000 meters across the Texas Gulf Coast. We have used this data to estimate the temperature of groundwater at the depths where water wells are screened.

We have analyzed the water chemistry data set from the TWDB groundwater data set and developed estimates of Total Dissolved Solid concentrations for wells with screen information. Where sufficient water quality data exists, we have calculated the percent contributions of the major ions to the cation and anion balance.

Task 3 Quantify Groundwater Volumes

We have obtained approximately 100 geophysical logs that can be used to estimate porosity values and have analyzed the logs to investigate for evidence of possible spatial and depth trends with porosity.

We are working with the Subsurface Library to identify additional porosity logs. We anticipate using approximately 200 geophysical logs to define the spatial pattern in porosity for the Gulf Coast Aquifer System. Considerable difficulty has been encountered with location suitable logs for defining porosity values.

We have developed a working prototype of the groundwater volume calculator. The aquifer structure is based on the chronographic stratigraphic analysis provided in recent TWDB reports by Young and others (2010, 2012). The spatial discretization consists of a uniform grid of 1-mile by 1-mile grid cells.

Task 4 Delineate Groundwater Brackish Zones

We have obtained from the Texas Railroad Commission a database that provides the location of oil & gas injection wells and their uppermost zone for permitted for injection. As discussed in a meeting with the TWDB on May 17th the injection wells locations are extensive across the study area.

We have completed our analysis of marine shales that represent a hydrogeological barrier.

We are about 30% completed of our analysis of sands units that could potentially serve as brackish production zones.

We are about to start the process of defining non-marine shales and other confining units that could act as confining barriers.

Task 5 Stakeholder Communications

A date of June 22nd at 1:30 pm was selected for the stakeholder meeting to be held at the TWDB offices in Austin, Texas. The TWDB sent out announcements to potentially interested parties.

Task 6 Determine Volume of GW Brackish over 30-year and 50-year Periods

Developed and tested an approach for modeling the production of brackish groundwater using MODFLOW-USG.

Developed an approach to construct three-dimensional models along selected cross-sections to simulate production from potential brackish zones based on aquifer properties extracted from the Northern Gulf Coast GAM, the Central Gulf Coast GAM, and the Alternative GMA 16 model.

Task 7 Reporting and Deliverables

No work was performed

3.0 Planned Activities for the Next Month

Task 1 Project Management

Set up contract with Corolla.

Task 2 Delineate Fresh, Brackish, and Saline Groundwater

Digitize approximately 200 geophysical logs.

Evaluate alternative methods for estimating the water quality classification of groundwater based on geophysical logs information.

Task 3 Quantify Groundwater Volumes

Develop preliminary estimates of groundwater volumes for different water quality classifications.

Task 4 Delineate Groundwater Brackish Zones

Complete the initial selection of potential brackish production zones.

Task 5 Stakeholder Communications

Conduct stakeholder meeting on June 22.

Task 6 Reporting and Deliverables

Submit the Technical Approach memo to TWDB for review

4.0 Problems/Issues and Actions Required/Taken

Progress has been slowed because of delays associated with getting geophysical logs digitized. Our current approach requires that more than double the number of logs than estimated in the proposal. The additional digitizing requires additional time.

As expressed in our 17 May meeting with the TWDB, we are concerned regarding the relatively high density of permitted injections zones that occur at depths above 4000 feet below ground. It appears that a large amount of groundwater with TDS concentrations less than 35,000 ppm may not be considered as candidates for potential brackish production zones because of the occurrence of permitted injection zones.