

**Development of Water Use Estimates and Projections in the
Texas Mining and Oil and Gas Industries**

**TWDB Contract Agreement 2100012474
USGS Award Number G20AC0039
Progress Report 02**

September 1 2021

Submitted by:

Bridget Scanlon
University of Texas, Bureau of Economic Geology
Pickle Research Campus, Bldg. 130, Univ. of Texas, 10100 Burnett Rd., Austin Texas 78758
512 471 8241 bridget.scanlon@beg.utexas.edu

**Texas Mining Water Use Study
TWDB Contract Agreement 2100012474
Progress Report 02
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Submitted to: Katie Dahlberg – Contract Manager, TWDB
Yun Cho – Manager, Economic and Demographic Analysis, TWDB

Submitted by: Bridget R Scanlon, - Senior Research Scientist UTBEG

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Progress Report

I. Accomplishments to date

Task 1. Quantify current and historical water use for hydraulic fracturing and produced water volumes.

We finalized the water volumes for hydraulic fracturing by county for all of the plays in Texas for 2018. The primary data source was FracFocus; however, we compared results with those from the IHS database. Results from the two databases are generally consistent, in part, because IHS has been incorporating more and more data from FracFocus over the years. A total of six plays were evaluated, including the Barnett, Eagle Ford, Haynesville, and Permian plays. Hydraulic fracturing water use totaled ~ 103 Bgal (0.3 maf) in 2019. Time series of hydraulic fracturing water use shows a gradual increase from 2009 – 2014, followed by a slight decline during 2014 – 2016 with a sharp increase through 2018. Water use for hydraulic fracturing stabilized in 2018 and 2019. A total of ~ 15,000 wells were drilled to support hydraulic fracturing between 2010 and 2019, ~5,000 wells in the Ogallala aquifer and ~5,000 wells in the Dockum aquifer.

Task 2. Identify the sources of water for hydraulic fracturing

We finalized linking water use for hydraulic fracturing with the source of water for the different plays. We finalized relating wells listed as Fracking Supply, Rig Supply, and Industrial water use purpose attributes to aquifers in each of the plays using the Texas Submitted Drillers Reports database by the Texas Department of Licensing and Regulation. Aquifer assignments were made based on well depths and the aquifer depths from the Groundwater Availability Model grids for both major and minor aquifers. Where wells penetrate more than one aquifer, the producing aquifer was assumed to be the deepest aquifer. We will extend this analysis to assess other sources of water for hydraulic fracturing, including surface water sources and reuse of produced water and municipal wastewater.

Task 3. Develop projections of future water demand for oil and gas (2020–2080):

We have begun to write up a document describing the methodology used to develop future projections of water demand for hydraulic fracturing for oil and gas in the major plays in Texas.

We have begun to develop demand projections by county in the Permian Basin from 2020 – 2080.

Task 4. Identify locations of operations and quantify current and projected future water use for coal and lignite mining:

We have not made further progress on this task.

Task 5. Identify locations of operations and quantify current and projected future water use for aggregates:

We have compiled water use data for aggregates from the TCEQ database.

We have been comparing water wells drilled in the vicinity of aggregate operations using the Texas Submitted Drillers Reports database by the Texas Department of Licensing and Regulation and assessing different radii from the operations (e.g. 2 – 10 miles). We will evaluate the ownership of these wells to assess groundwater use to support the aggregate industry.

Task 6. Collaborate with USGS personnel on water use for the mining category:

We compiled data on water use for the mining category from USGS reports.

- a. A comparison of accomplishments to the planned objectives and timeline for the progress period:

The first deliverable to TWDB is due on 11/30/2021; therefore, we are making good progress and should not have any problems meeting the deadlines for deliverables.

- b. Reasons why any established goals were changed or not met: No goals were changed.
c. Additional pertinent information, including an explanation of cost overruns: NA

II. Anticipated activities and adjustments to the program during the next (6-month) progress period.

- We will do a formal comparison of water use for hydraulic fracturing based on the FracFocus database and the IHS database. We will describe approaches to identify outliers in the databases using various data sources. We will finalize Task 1 by comparing water use for hydraulic fracturing from FracFocus and HIS with TWDB and USGS reported volumes.
- We will finalize development of a database of frac water supply wells by aquifer and characterize the water quality for each of the aquifers using the TWDB database.
- We will evaluate other sources of water for hydraulic fracturing, particularly reuse of produced water by working with Texas Oil and Gas Association, ranking the primary operators in each of the plays and communicating with them and contacting water midstream companies, particularly those in the Midland Basin. We will also contact the Groundwater Conservation Districts to assess water sources for hydraulic fracturing.
- We will finish the write up of the methodology for long-range projections of water use for hydraulic fracturing (2020 – 2080) and complete the demand projections for the Permian Basin.
- We will finalize comparison of projections of Technically Recoverable Oil and Gas production from UTBEG with those from the USGS.
- We will continue working on the remaining Tasks (4 – 8).

III. List any changes to lead project personnel and provide contact information. No changes.