TGPC Groundwater Quality Monitoring Survey

Summary of Reponses

Introduction

- The Texas Groundwater Protection Committee (TGPC, https://tgpc.texas.gov/) conducted an online Groundwater Quality Monitoring Survey on June 15 – July 28, 2023
- The survey focused on groundwater quality monitoring programs in Texas and their associated datasets
- The purpose of the survey was to gain a better understanding of the various groundwater quality data collection efforts taking place across the state in order to identify potential data gaps, monitoring needs, and opportunities for collaboration

Introduction (cont.)

- For this survey
  - A monitoring program was defined as routine (proactive or reactive) sampling that followed an approved protocol; and,
  - A dataset was defined as related information that was grouped together and organized into a shareable format for either an individual sampling event or a series of sampling events
- The survey had 18 questions
  - Questions 1 – 3 were related to the respondent's contact information (i.e., name, email address, and phone number) and are not included in this summary
- 44 survey responses were received

Question 4 (Q4) - Respondent Affiliations *

- State and federal agencies and organizations
  - Bureau of Economic Geology of The University of Texas at Austin (UTBEG)
  - Texas Commission on Environmental Quality (TCEQ) – four responses
  - Texas Parks and Wildlife Department (TPWD) – two responses
  - U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS)
  - U.S. Geological Survey (USGS)
  - Texas State Soil and Water Conservation Board (TSSWCB)
  - Texas Department of State Health Services (DSHS)
  - Texas Water Development Board (TWDB) – two responses
  - Texas Department of Agriculture (TDA)

* required response

Q4 - Respondent Affiliations * (cont.)

- Groundwater Conservation Districts (GCDs)
  - Brush Country GCD
  - Pecan Valley GCD
  - Upper Trinity GCD
  - Rolling Plains GCD
  - Uvalde County Underground Water Conservation District (UWCD)
  - Kenedy County GCD
  - Panhandle GCD

* required response

Q4 - Respondent Affiliations * (cont.)

- GCDs (cont.)
  - Duval County GCD
  - Fayette County GCD – two responses
  - North Plains GCD
  - Post Oak Savannah GCD
  - Barton Springs Edwards Aquifer Conservation District – two responses
  - Gonzales County UWCD
  - Real-Edwards Conservation and Reclamation District
  - Edwards Aquifer Authority

* required response

Q4 - Respondent Affiliations * (cont.)

- Researchers
  - Texas A&M University – three responses
  - Texas Water Resources Institute (TWRI)

- Water Utilities
  - City of Houston Public Works
  - Mustang Special Utility District (SUD)
  - Austin Water (City of Austin) Balcones Canyonlands Preserve Program

* required response

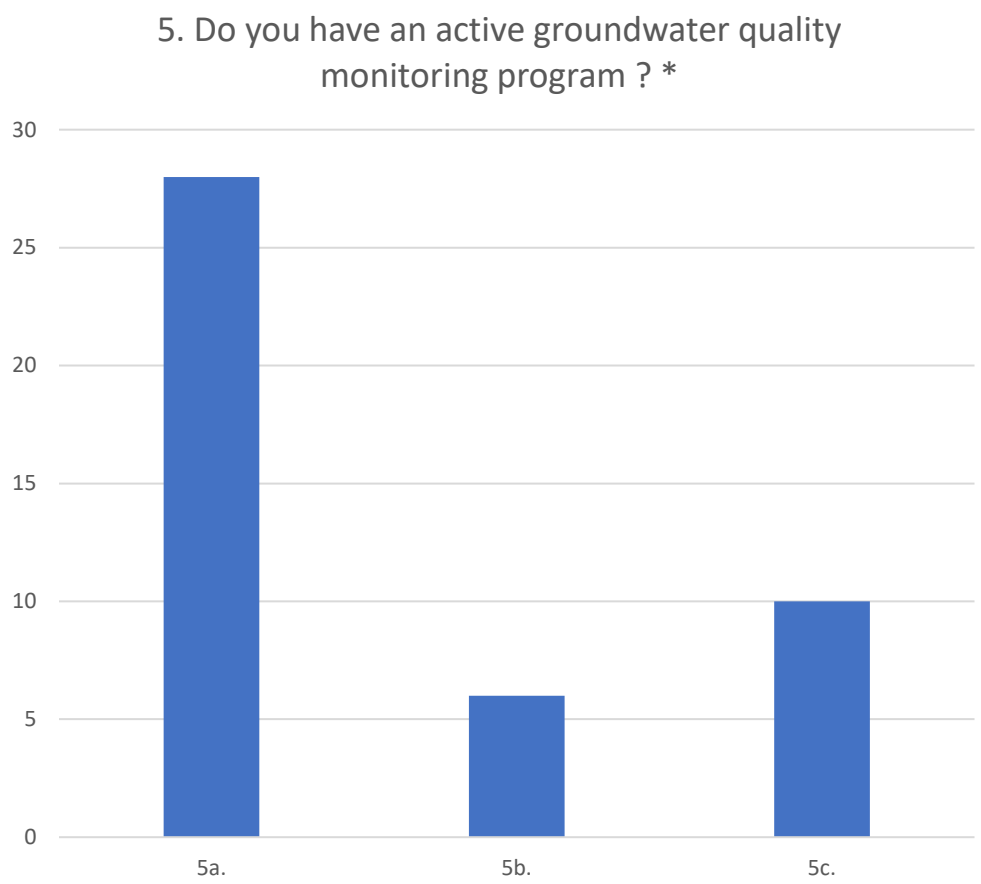
Q4 - Respondent Affiliations * (cont.)

- Water Organizations
  - Colorado and Lavaca Rivers and Matagorda and Lavaca Bays Basin and Bay Area Stakeholder Committee (BBASC) and Region P Water Planning Group
  - Texas A&M AgriLife Extension Service - Texas Well Owner Network (TWON)
  - The Meadows Center for Water and the Environment – Texas Stream Team
  - The Meadows Center for Water and the Environment – Staff

- Other
  - Self
  - Graphic Packaging International

* required response

Q5 - Do you have an active groundwater quality monitoring program ? *



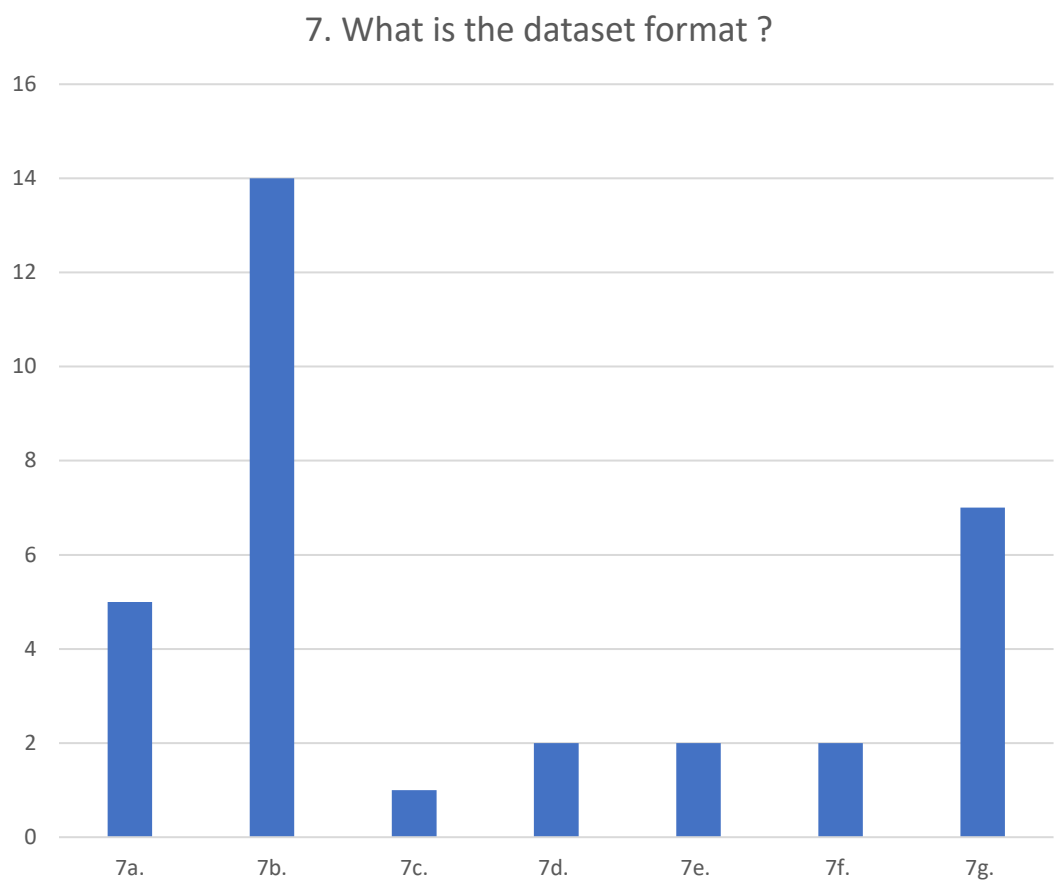
5a. Yes (64%)

5b. Not currently (14%)

5c. No (23%)

* required response

Q7 - What is the dataset format ?



7a. Hard copy (15%)

7b. Microsoft Excel (42%)

7c. Microsoft Access (3%)

7d. GIS geodatabase (6%)

7e. Oracle (6%)

7f. SQL server (6%)

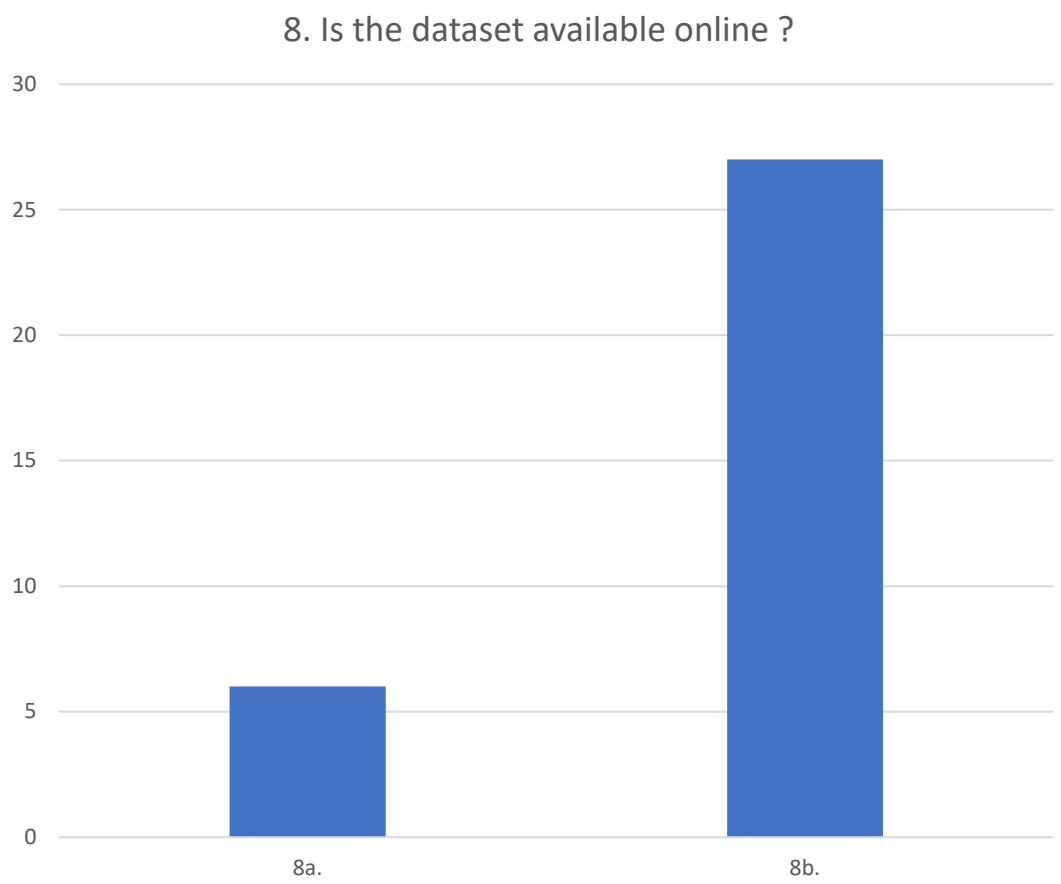
7g. Other (21%)

Q7 - What is the dataset format ?

Other

- Lab results uploaded to database in pdf format
- Mix of hardcopy, excel, and geodatabase
- Halff Database
- HALFF database
- Access through NWIS web at present
- Hard copies and excel
- Aquarius Samples

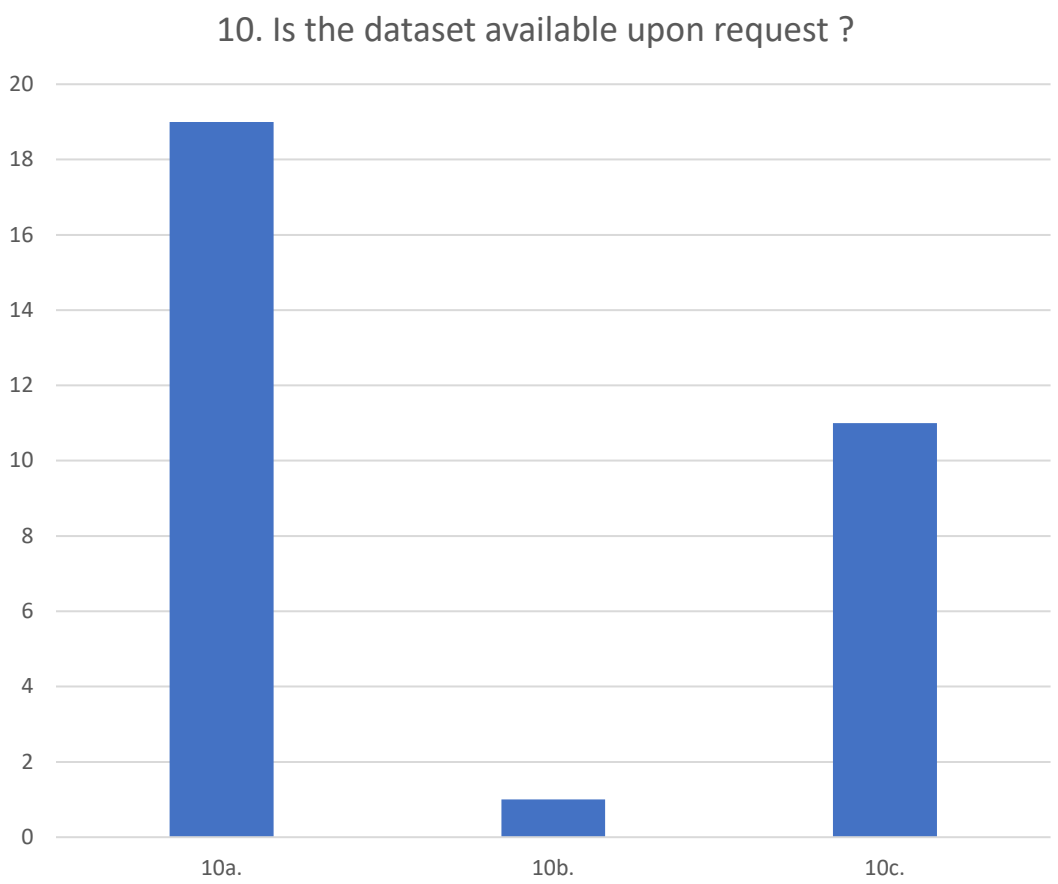
Q8 - Is the dataset available online ?



8a. Yes (18%)

8b. No (82%)

Q10 - Is the dataset available upon request ?

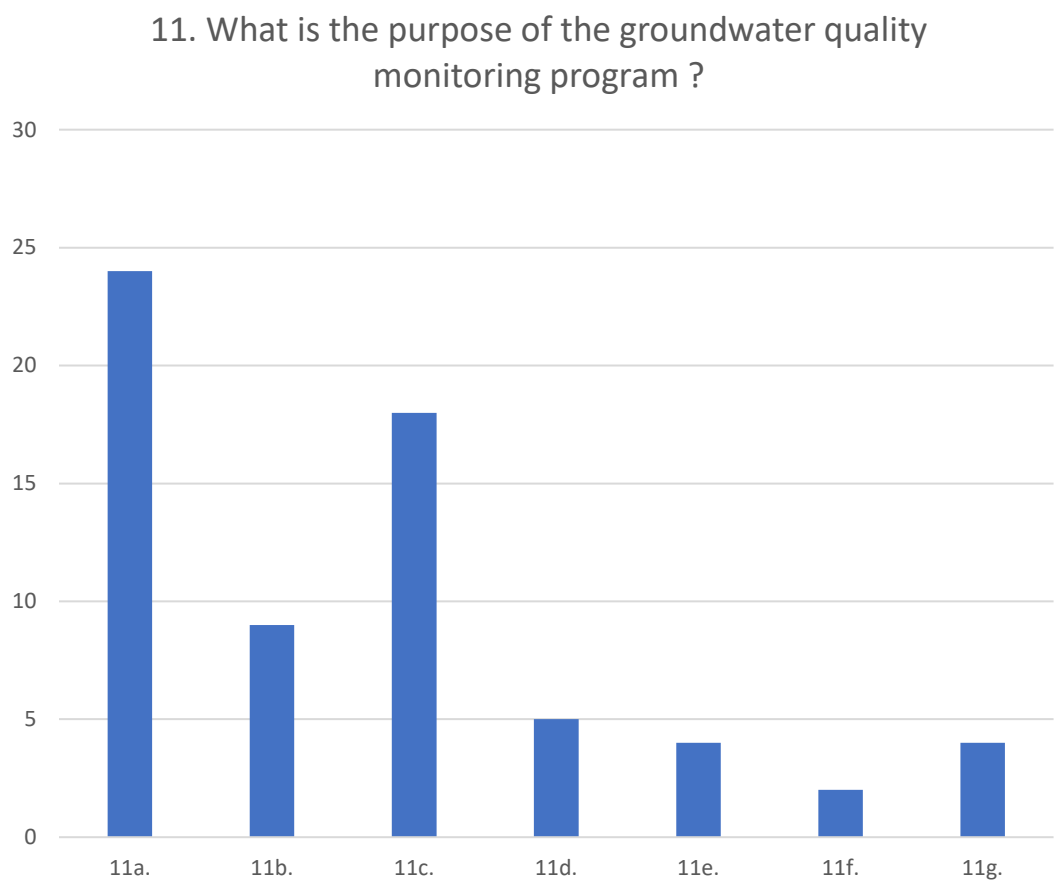


10a. Yes (61%)

10b. No (3%)

10c. Partially (35%)

Q11 - What is the purpose of the groundwater quality monitoring program ?



11a. Ambient (36%)

11b. Public outreach and education (14%)

11c. Research (27%)

11d. Investigation (8%)

11e. Regulatory (6%)

11f. Post-disaster response (3%)

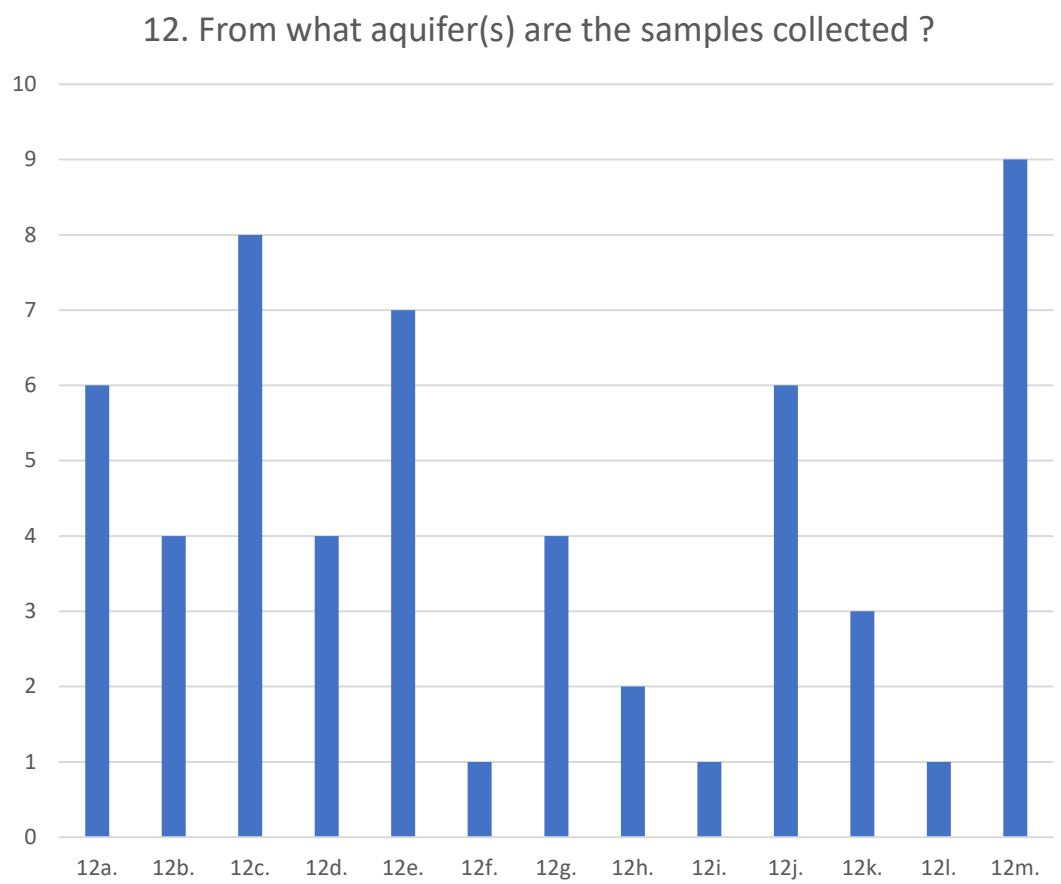
11g. Other (6%)

Q11 - What is the purpose of the groundwater quality monitoring program ?

Other

- FIFRA and 106 Groundwater PPG grants
- Possible contamination from oil/gas activity
- Monitoring Changing Conditions
- Evaluate management practices

Q12 - From what aquifer(s) are the samples collected ?



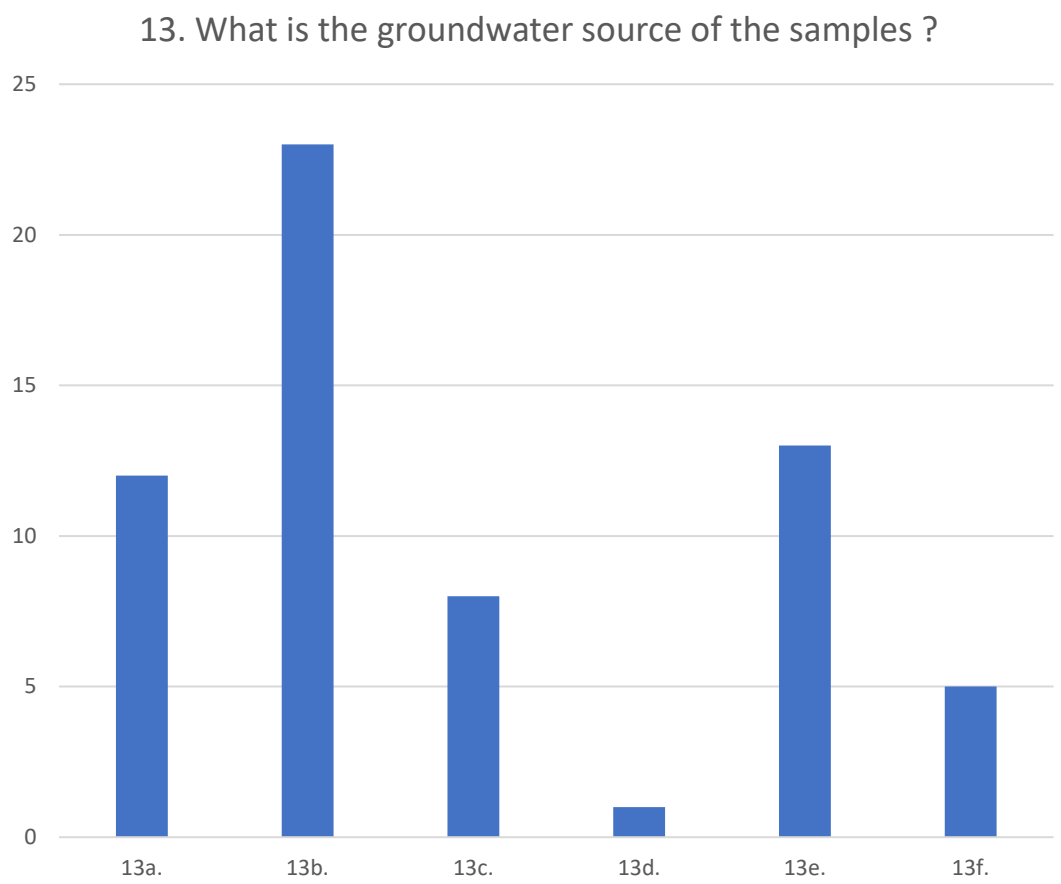
12a. Every major/minor aquifer (11%)
12b. Carrizo-Wilcox (7%)
12c. Edwards (BFZ) (14%)
12d. Edwards-Trinity (Plateau) (7%)
12e. Gulf Coast (13%)
12f. Hueco-Mesilla Bolsons (2%)
12g. Ogallala (7%)
12h. Pecos Valley (4%)
12i. Seymour (2%)
12j. Trinity (11%)
12k. One or more minor aquifers (5%)
12l. Unknown (2%)
12m. Other (16%)

Q12 - From what aquifer(s) are the samples collected ?

Other

- Statewide
- Woodbine
- Dockum and Blaine/Whitehorse
- Multiple aquifers statewide (57 stations on spring/seep/artesian wells) - information available upon request
- One Dockum well is continually monitored
- Queen City, Sparta, Yegua-Jackson
- Maverick TBA
- Chicot
- Ellenburger-San Saba - the current program network is limited in scope, with plans to eventually expand the network into more aquifers

Q13 - What is the groundwater source of the samples ?



13a. Public water supply well (19%)

13b. Private water well (37%)

13c. Standard monitor well (13%)

13d. Multiport monitor well (2%)

13e. Spring (21%)

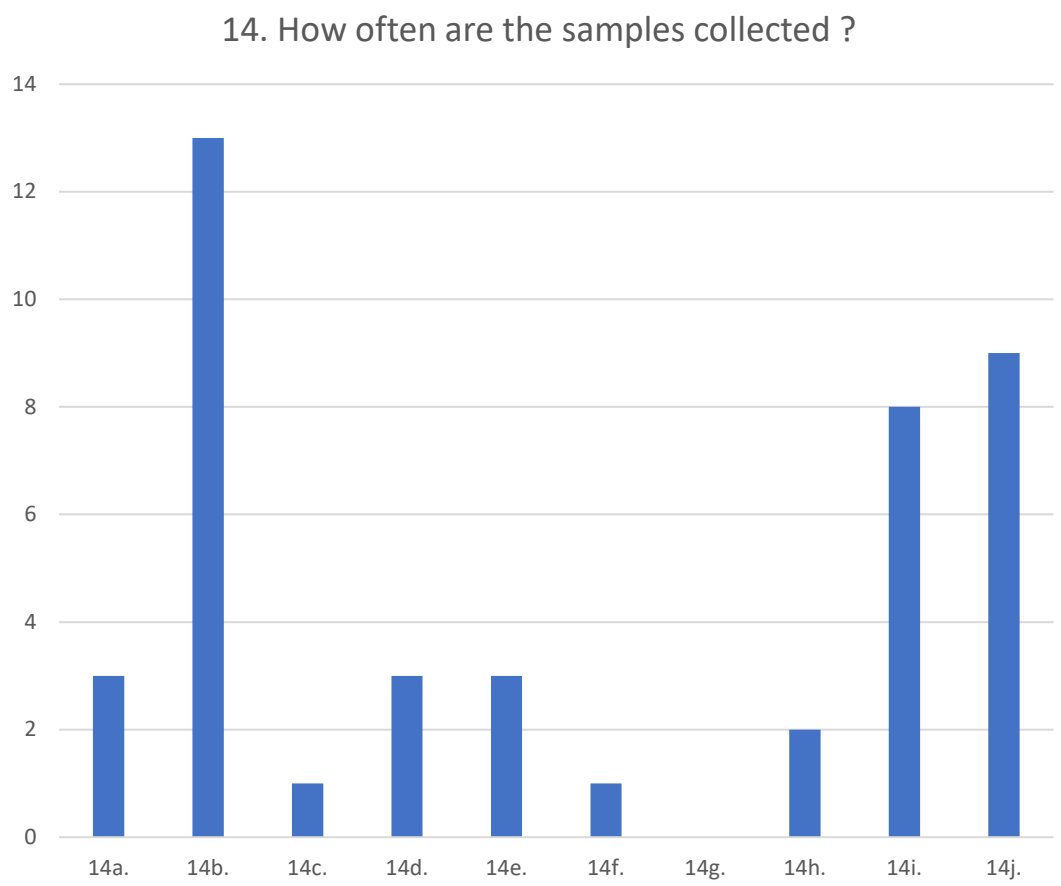
13f. Other (8%)

Q13 - What is the groundwater source of the samples ?

Other

- Spring/seep/artesian wells
- Rainfall entering the Edwards aquifer
- Cave drip
- Household water supply sources
- Surrounding surface water features are used as needed to assist with discharge/flow rate measurement calculations

Q14 - How often are the samples collected ?



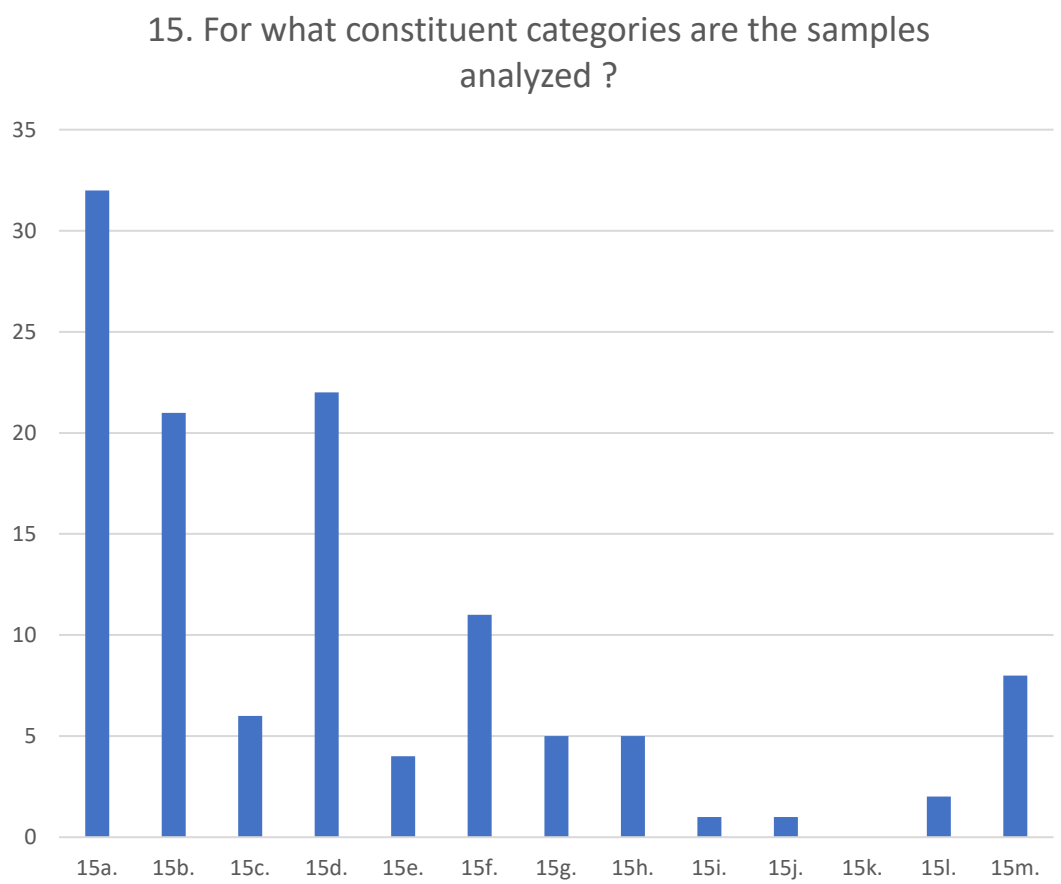
14a. Less frequently than annually (7%)
14b. Annually (30%)
14c. Twice per year (2%)
14d. Quarterly (7%)
14e. Monthly (7%)
14f. Weekly (2%)
14g. Daily (0%)
14h. Continuously (5%)
14i. As required (19%)
14j. Other (21%)

Q14 - How often are the samples collected ?

Other

- Triggered source monitoring per regulations
- Approximately every 5-7 years, as authorized by GCD Board
- Once
- Biennially
- Wells samples once for this study between 2013 and 2017
- Every two years
- Water Quality 1x year, Water Level 3x year
- Samples are collected annually from different parts of the state so that every major and minor aquifer is sampled once every four years. We collect additional limited sampling on an as-needed frequency for special studies or other needs as funds allow.
- Network springs are currently sampled annually; however, the scope of the program is being assessed and may change to a four year cycle, similar to our well sampling program, in order to maximize resources.

Q15 - For what constituent categories are the samples analyzed ?



15a. Field parameters (27%)
15b. Nutrients (18%)
15c. Organics (5%)
15d. Inorganics (19%)
15e. Pesticides (3%)
15f. Microbes (9%)
15g. Radionuclides (4%)
15h. Stable isotopes (4%)
15i. Pharmaceuticals (1%)
15j. Water/wastewater treatment products (1%)
15k. Microplastics/nanoplastics (0%)
15l. Other specific legacy/emerging contaminants (2%)
15m. Other (7%)

Q15 - For what constituent categories are the samples analyzed ?

Other

- Sediment and Biological (habitat, macrobenthics, fish)
- Sulfates, Iron, Chloride
- PFAS
- Periphyton biomass and periphyton chlorophyll-a
- Optical brighteners
- Ions

Q15 - For what constituent categories are the samples analyzed ? (cont.)

Other

- Isotopes are reserved for special studies. Pesticides are collected by TWDB staff as part of the TCEQ cooperative program; however analyses and results are paid for and stored in a database by TCEQ. Pesticides are not part of TWDB program and have not been selected here for the purposes of this survey. Radionuclides are collected from aquifers known to have naturally occurring material.

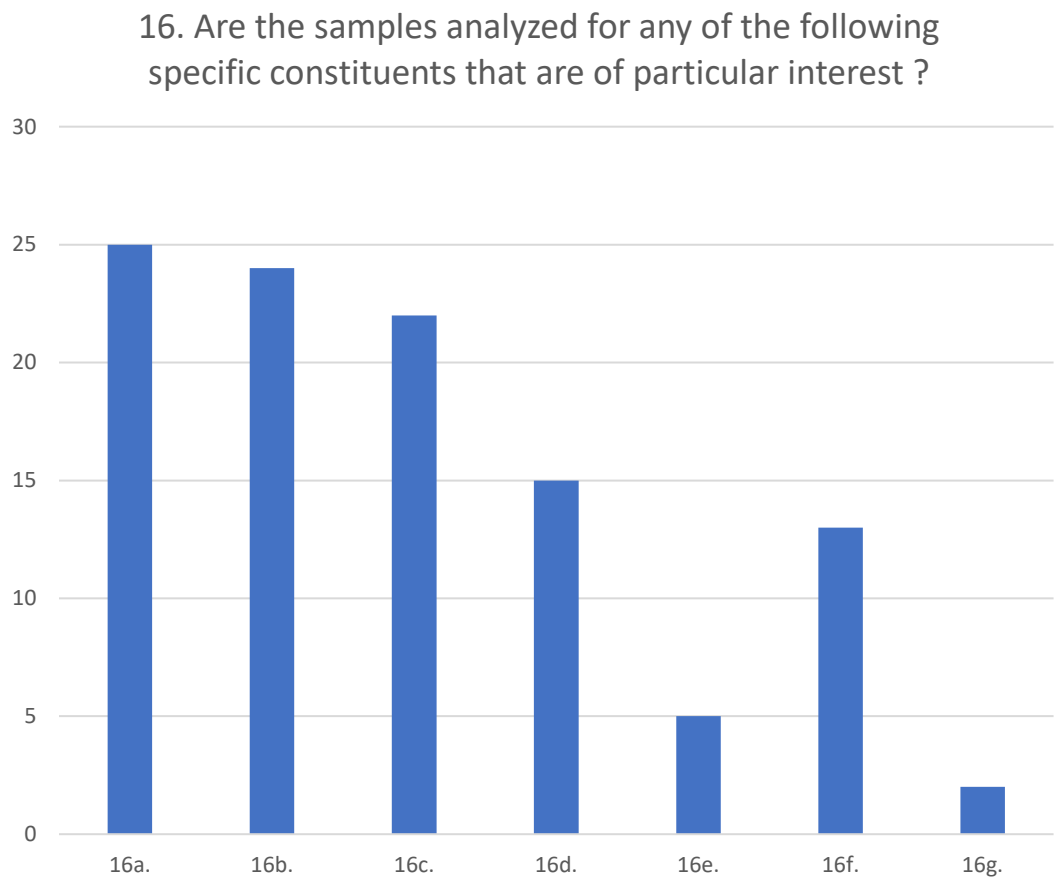
Q15 - For what constituent categories are the samples analyzed ? (cont.)

Other

- Isotopes are usually collected when the spring is initially sampled only. Field parameters are collected each time a spring is visited in conjunction with the discharge/flow rate. Nutrients and inorganics are collected annually; however a recent program change was implemented where only field parameters were collected during repeat visits to network sites in order to maximize resources. This will be assessed going forward. Radionuclides are collected from aquifers where they are know to exist naturally. Pesticides are collected by TWDB staff as part of the TCEQ cooperative program; however analyses and results are paid for and stored in a database by TCEQ. Pesticides are not part of TWDB program and have not been selected here for the purposes of this survey.

** For Q15, one respondent selected "Other specific legacy/emerging contaminants" but didn't specify it in "Other" - however, their answer to Q16 indicates that it is PFAS

Q16 - Drilling down into some of the categories in the previous question, are the samples analyzed for any of the following specific constituents that are of particular interest ?



16a. Conductivity (24%)

16b. Nitrate (23%)

16c. TDS (21%)

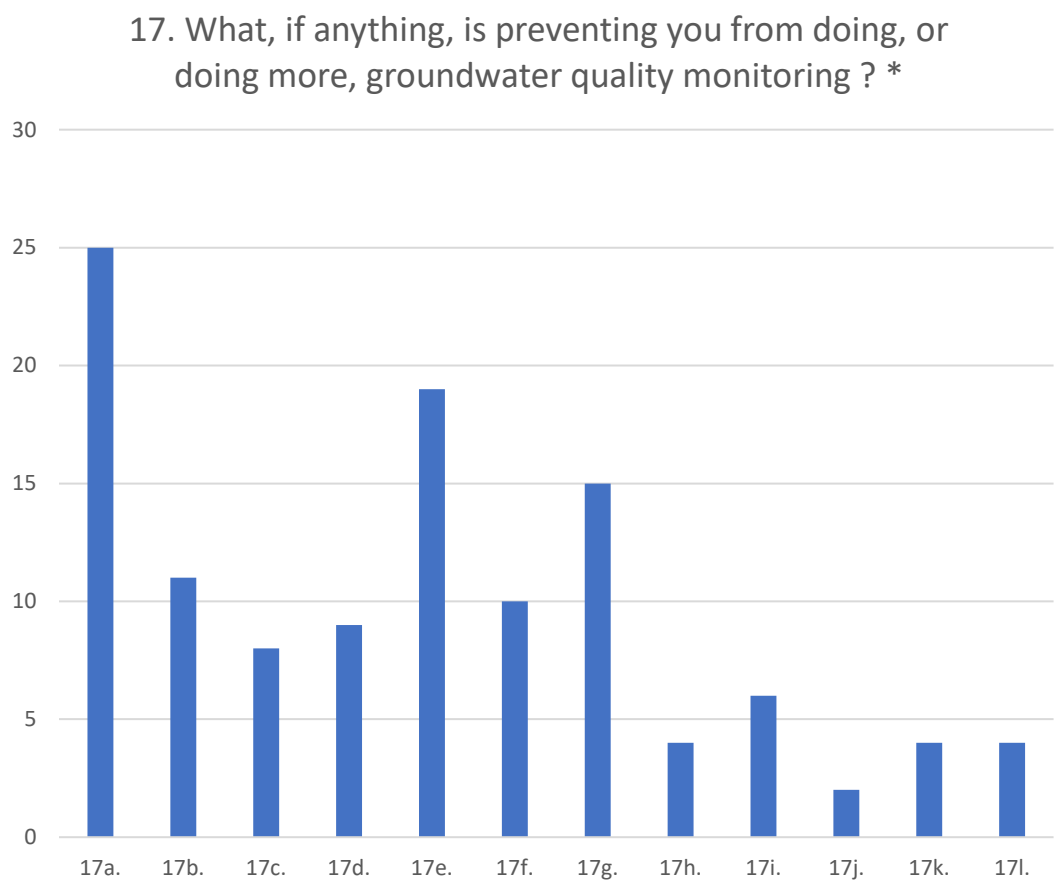
16d. Arsenic (14%)

16e. Atrazine (5%)

16f. E. coli (12%)

16g. PFAS (2%)

Q17 - What, if anything, is preventing you from doing, or doing more, groundwater quality monitoring ? That is, what are you lacking ? *



17a. Funding (21%)
17b. Analysis cost (9%)
17c. Equipment (7%)
17d. Training (8%)
17e. Staff (16%)
17f. Access (9%)
17g. Time (13%)
17h. Approval or mandate (3%)
17i. Logistics (5%)
17j. Unknown (2%)
17k. Not applicable (3%)
17l. Other (3%)

* required response

Q17 - What, if anything, is preventing you from doing, or doing more, groundwater quality monitoring ? That is, what are you lacking ? *

Other

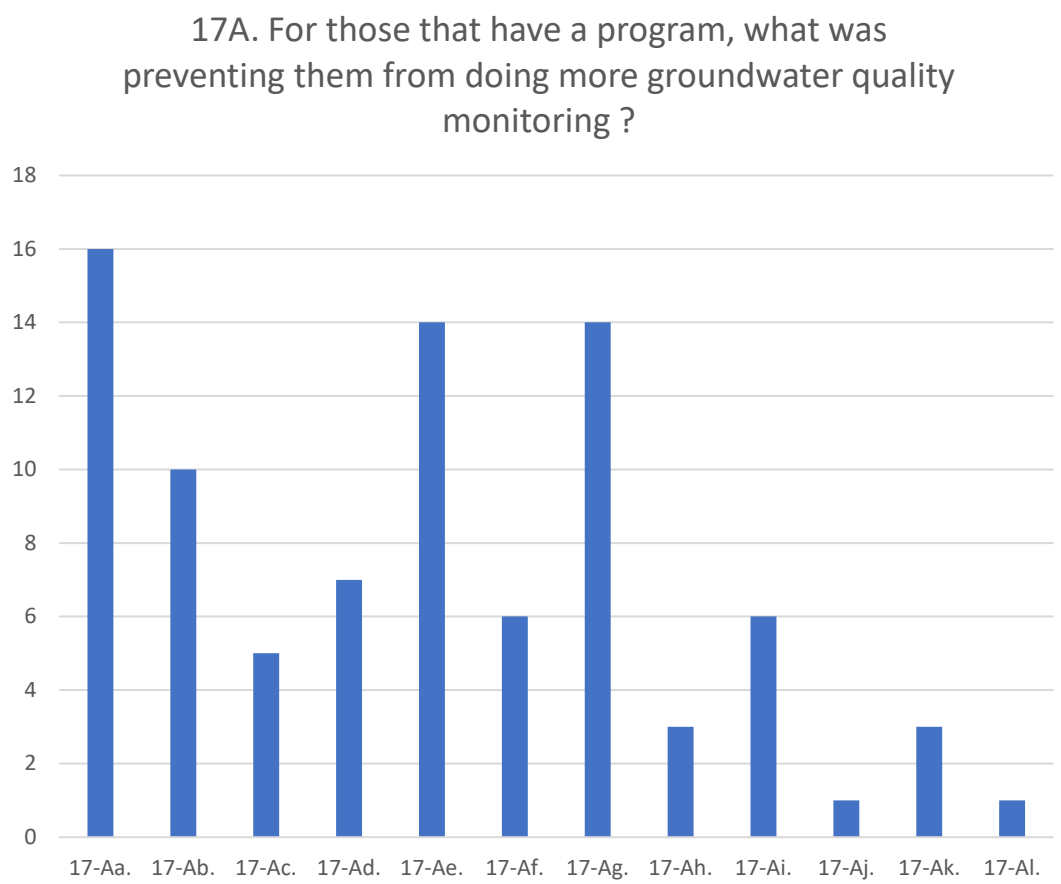
- It is not really within our committees' purview
- Project specific reasons
- A program has not been established
- N/A - We do not have a groundwater monitoring program as part of our federal mandate or mission

* required response

Question 17 - Details

- An additional analysis of Question 17 compares the responses of those that A) have, B) may/will have, and C) do not have an active groundwater quality monitoring program

Q17A – For those that have a program, what was preventing them from doing more groundwater quality monitoring ?



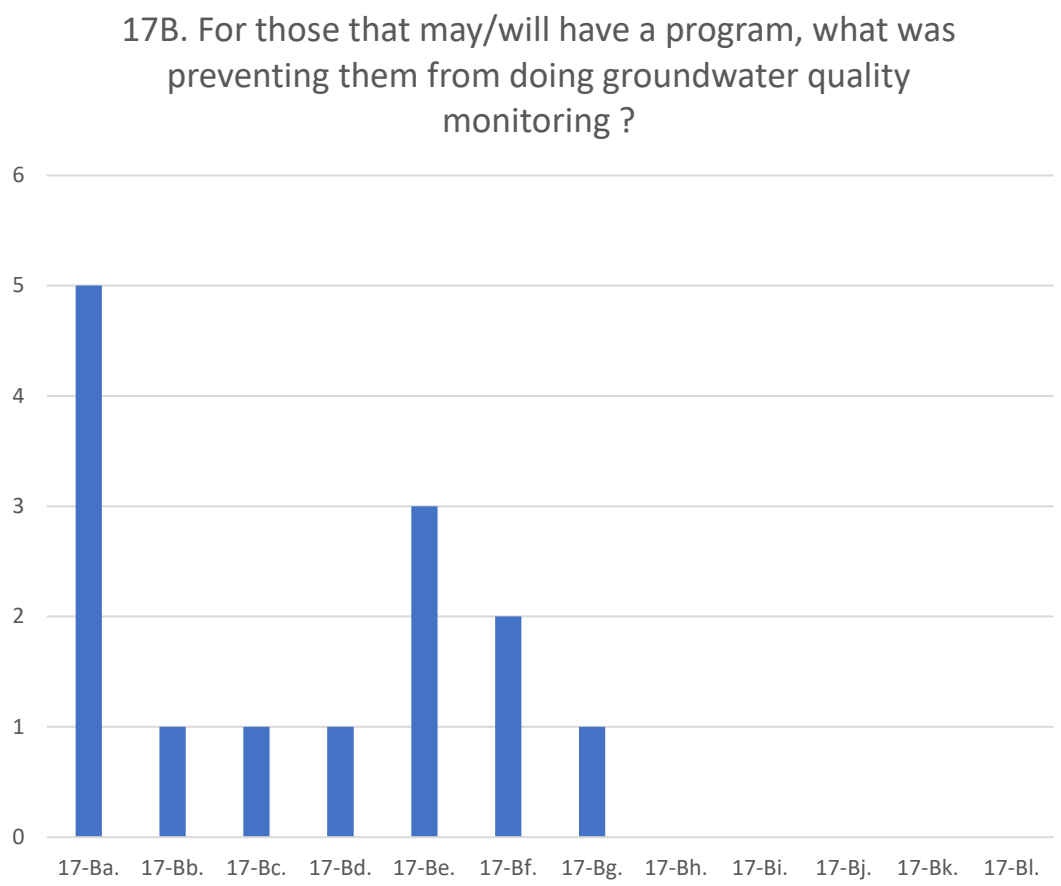
17-Aa. Funding (19%)
17-Ab. Analysis cost (12%)
17-Ac. Equipment (6%)
17-Ad. Training (8%)
17-Ae. Staff (16%)
17-Af. Access (7%)
17-Ag. Time (16%)
17-Ah. Approval or mandate (3%)
17-Ai. Logistics (7%)
17-Aj. Unknown (1%)
17-Ak. Not applicable (3%)
17-Al. Other (1%)

Q17A – For those that have a program, what was preventing them from doing more groundwater quality monitoring ?

Other

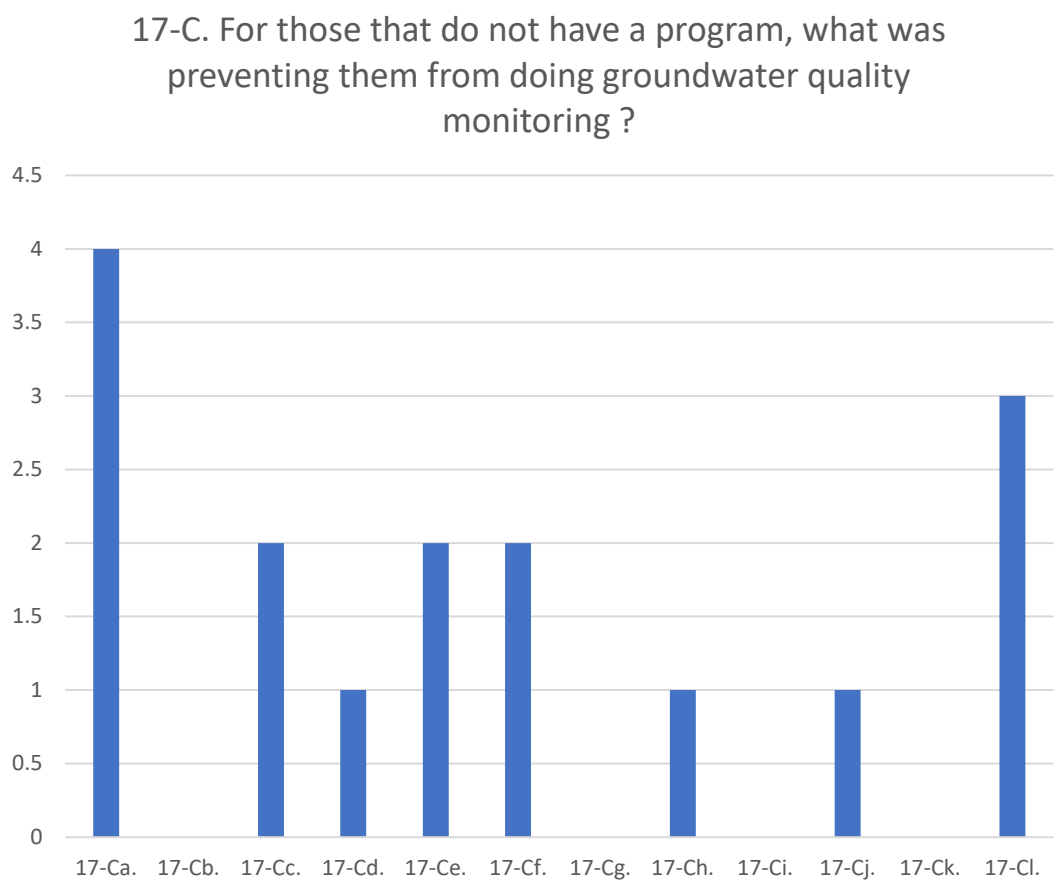
- Project specific reasons

Q17B – For those that may/will have a program, what was preventing them from doing groundwater quality monitoring ?



17-Ba. Funding (36%)
17-Bb. Analysis cost (7%)
17-Bc. Equipment (7%)
17-Bd. Training (7%)
17-Be. Staff (21%)
17-Bf. Access (14%)
17-Bg. Time (7%)
17-Bh. Approval or mandate (0%)
17-Bi. Logistics (0%)
17-Bj. Unknown (0%)
17-Bk. Not applicable (0%)
17-Bl. Other (0%)

Q17C – For those that do not have a program, what was preventing them from doing groundwater quality monitoring ?



17-Ca. Funding (25%)
17-Cb. Analysis cost (0%)
17-Cc. Equipment (13%)
17-Cd. Training (6%)
17-Ce. Staff (13%)
17-Cf. Access (13%)
17-Cg. Time (0%)
17-Ch. Approval or mandate (6%)
17-Ci. Logistics (0%)
17-Cj. Unknown (6%)
17-Ck. Not applicable (0%)
17-Cl. Other (19%)

Q17C – For those that do not have a program, what was preventing them from doing groundwater quality monitoring ?

Other

- It is not really within our committees' purview
- A program has not been established
- N/A - We do not have a groundwater monitoring program as part of our federal mandate or mission

Q18 - Do you have any additional feedback or information to share related to this survey ?

- The IPD database contains more than just the Cooperative Pesticide Monitoring data, much of it being USGS data available from their online database, as well as several other sources. The USGS data and TCEQ data are in a very different format that requires considerable effort and time to combine. The National Water Quality Monitoring Council's Methods and Data Comparability Board has been working to compare various databases and sources in an effort to develop a system that all sources can agree on and is more compatible with each other.
- Also, there are data qualifiers, especially for old data that had higher reporting and qualifier limits, and no Quality Assurance or Quality Controls, and may have some essential information or data missing. Other state's programs and data should be checked to see what they have already done with related data rather than reinventing the wheel, so to speak.

Q18 - Do you have any additional feedback or information to share related to this survey ? (cont.)

- Accessing the TCEQ water quality records is challenging. The platform is not easy to navigate.
- Generally, groundwater samples are collected at the groundwater/surface water interface as part of a larger ambient surface water monitoring program. Samples may also be collected as part of special studies to determine possible effects of groundwater intrusion in surface waters.
- Our volunteer monitoring wells and the data from those wells are used to enhance knowledge of the aquifers underlying the Fayette County GCD and to monitor for any potential issues with those aquifers. Currently, the district samples 10-30 wells each year.

Q18 - Do you have any additional feedback or information to share related to this survey ? (cont.)

- This study was conducted to mirror the 1965 county-wide water quality study by the TWDB. Analytical results indicated that there was no significate variation in water quality between the two studies.
- Our district has 30 wells across the district that we take water quality samples from. We sample 15 each year, so all 30 are almost every two years. We also conduct water quality sampling for stakeholders, and that data is collected and kept in the district water quality database.
- My lab analyzes PFAS, pharmaceutical and personal care products, and other organic molecules. I am interested in understanding them in groundwater but do not have access to a groundwater site.

Q18 - Do you have any additional feedback or information to share related to this survey ? (cont.)

- The USDA Natural Resources Conservation Service NRCS provides technical and financial assistance to the public through a network of more than 3,000 service centers in communities nationwide. It helps agricultural producers and other private landowners in implementing soil, water, and other natural resource conservation measures. NRCS relies on other Federal and State agencies to provide surface and ground water monitoring data.
- Water quality sampling is required for our federal Balcones Canyonlands Conservation Plan 1996 permit and provides evaluation of our management practices. However, since I am the only staff with extensive water quality education and experience, and am also program manager, we don't immediately analyze all of the data we collect.

Q18 - Do you have any additional feedback or information to share related to this survey ? (cont.)

- Gonzales County Underground Water Conservation District conducts Water Quality testing annually on 75-85 water wells in multiple formations. A PFD copy of the reports is available here: https://gcuwcd.org/water-quality
- Several aquifers monitored for various constituents but not necessarily on a consistent basis. Can pull information from NWIS web to see what may have been analyzed for GW in Texas.
- TWON is an Extension educational program that covers the state of Texas and we work with private well owners. We do not have access to a set of wells to do our program more often.

Q18 - Do you have any additional feedback or information to share related to this survey ? (cont.)

- The plan to collect samples for the coastal groundwater study starts Spring 2024.
- Texas Stream Team community science water quality monitoring program includes sampling at various springs across the state.
- https://www.meadowscenter.txst.edu/research/water-conservation/how-much-water-is-in-the-hill-country.html
- The TWDB Groundwater Database contains data collected both by TWDB and external entities/cooperators. The scope of cooperator monitoring programs and associated analytes they collect/areas they sample will differ from the TWDB program. For the purposes of this survey, we included information for the scope of the TWDB ambient groundwater monitoring program.

Q18 - Do you have any additional feedback or information to share related to this survey ? (cont.)

- Most of the springs monitoring data we collect is uploaded and stored in the SQL server. However, our database does not currently have a field to capture spring discharge/flow rate information, which is currently stored in an excel file/hard copy field sheets and can be shared upon request. Plans are in progress to update the SQL server to incorporate discharge information.
- TDA over the past decades has defaulted, either by choice or legislative mandate, to our sister agencies to monitor groundwater and report the results out which we might use. There is currently no movement to fund TDA or provide FTEs for us to monitor any surface or groundwater. TDA expects the status quo for the foreseeable future.

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